Designated Aviation Medical Examiner's Handbook

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You should always refer to the applicable provisions of the Civil Aviation Act, Civil Aviation Regulations, Civil Aviation Safety Regulations and the Civil Aviation Orders, rather than this manual, to ascertain the requirements of, and the obligations imposed by or under, the civil aviation legislation.

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1. Administrative Aspects

1.1 Introduction

1.1.1 Abbreviations Used in this Handbook.

- ARN: Aviation Reference Number
- AMSANZ: Aviation Medical Society of Australia and New Zealand
- ASAM: Australasian Society of Aerospace Medicine
- AsMA: Aerospace Medicine Association
- ATPL: Airline Transport Pilot Licence
- CAA: Civil Aviation Act
- CAR: Civil Aviation Regulations
- CASR: Civil Aviation Safety Regulations
- CASA: Civil Aviation Safety Authority (Australia)
- DAEE: Designated Aviation Eye Examiner
- DAME: Designated Aviation Medical Examiner
- DAO: Designated Aviation Ophthalmologist
- FAA: Federal Aviation Administration (US)
- IAASM: International Academy of Aviation and Space Medicine
- ICAO: International Civil Aviation Organization
- JAA: Joint Aviation Authorities (Europe)
- MRS Online: Medical Records System Online
- PMO: Principal Medical Officer

1.1.2 The Origin and Development of the CASA DAME Handbook

CASA and its antecedent organizations have published advice for DAMEs concerning practical and administrative aspects of their duties for many years. The most comprehensive and semi-permanent repository of such advice has been CASA’s DAME Handbook, which originated in the late 1980s. The original hard copy publication was an amalgam of advice derived from many sources. Some of the material can be traced back to directives produced by the Aviation Medicine Branch within the Australian Department of Civil Aviation during the 1950s. A considerable debt is due also to earlier published advice from other Regulators, particularly CAA (New Zealand) and the US FAA.

The DAME Handbook was never intended to be completely prescriptive or authoritative, particularly in its more clinically oriented sections. The principal purpose of creating (and maintaining) such a publication is to provide a compact ready reference for DAMEs and anyone else in CASA’s procedures related to aeromedical certification. Soon after The DAME Handbook was first published, a need for further explanation and elaboration of its contents became obvious, leading to creation of periodic DAME Newsletters issued by the Director of Aviation Medicine. Jointly, these publications aspired to answer DAMEs’ FAQs and to provide guidance that would reduce errors and facilitate expeditious handling of the medical examinations and reports concerning applicants prepared for CASA.
By 1998, *The DAME Handbook* was showing distinct signs of nearing the end of its useful life. Parts of the *Handbook* had been so qualified and specifically interpreted that it was sometimes difficult for DAMEs and even for staff of CASA Aviation Medicine Section to understand all requirements. Thereafter, an interim revision was produced to remove the more glaring inconsistencies and contradictions that existed between it and some DAME Newsletters. At the same time, CASA had determined that all its future public documents should be created and maintained in electronic format, available on-line, rather than as hard copy. This decision had other major implications, particularly the accessibility of all such documents to unrestricted public scrutiny.

The first on-line version of *The DAME Handbook* was posted on CASA’s website in May 1999. It represented only an interim answer to a continuing need to provide succinct, accessible, relevant advice to DAMEs and other interested persons. At that stage, much of its contents still derived from the reverence accorded to our authoritative forebears, who had not been constrained to reach decisions on evidence-based medicine principles. At least the style was brought into line with modern CASA standards.

The next priority was to review the contents of the system-based chapters in Section 2. This task has continued ever since. CASA intends that this process will continue indefinitely, to ensure relevance and currency of guidance provided. CASA is committed to procedural transparency and to meeting best-practice standards in all of its activities. Aviation Medicine Section’s accelerating, continuous review of *The DAME Handbook* reflects that commitment and will result in the availability of a better, cross-referenced and more practically useful guide.

**1.1.3 Appointment and Legal Status of Designated Aviation Medical Examiners (Target Audience of the Handbook)**

In order to utilise a Flight Crew Licence or Air Traffic Service Licence, it is necessary to have a medical clearance at a standard appropriate to the licence held. Within Australia, designated medical practitioners perform the necessary medical examinations for the Aviation Medicine Section of the Civil Aviation Safety Authority.

Designated medical practitioners perform medical examinations to meet the provisions of the Civil Aviation Act, the Civil Aviation Regulations and the Civil Aviation Safety Regulations. The practitioners approved to perform these examinations are known as Designated Aviation Medical Examiners (DAMEs) or Designated Aviation Ophthalmologists (DAOs). They are responsible to the Principal Medical Officer, who oversees the administration of the DAME and DAO systems.

In order to meet CASA’s needs and the needs of applicants for medical certification, appropriately qualified holders of certain positions are also permitted to undertake the duties of DAMEs and DAOs.
In order to meet CASA’s needs and the needs of applicants who are distant from regular examiners for medical certification, appropriately qualified individual practitioners may also be permitted, as needed, to undertake the duties of DAMEs and DAOs.

Certain optometrists are also approved to perform all those examinations usually carried out by DAOs. These practitioners are known as Designated Aviation Eye Examiners (DAEEs).

To request appointment or reappointment as a DAME, DAO or DAEE, complete a CASA application form (Form 755). Intending applicants may wish first to obtain additional information from one of CASA’s DAME Liaison Officers.

1.1.4 Qualifications and Experience

1. Medical practitioners designated by CASA to perform Air Crew and Air Traffic Services medical examinations must be registered with the medical registration authority of the State or Territory of the Commonwealth or country in which they reside.

2. As a signatory to the Chicago Convention, Australia is bound to appoint as DAMEs only medical examiners that have had appropriate training in aviation medicine. Possession of the Australian Certificate in Civil Aviation Medicine or similar qualification is the normal minimum requirement for appointment as a DAME. A list of courses that CASA will routinely approve for this purpose is available on the CASA website. Applicants for appointment as DAMEs on the basis of completion of other courses should contact CASA’s DAME Liaison Officers to discuss requirements.

Prior to appointment, and periodically thereafter, DAMEs are required to give an undertaking to abide by specified conditions of appointment. This is contained in Form 755.

3. DAMEs are required to attend periodic training seminars or courses in aviation medicine approved by CASA. Routinely approved seminars or courses will be posted on the CASA website. Attendance at an aerospace medicine scientific meeting such as those conducted by ASAM (formerly AMSANZ), AsMA, IAASM, FAA, CASA or similar bodies is sufficient to meet this requirement. DAMEs may also apply individually for approval of other appropriate training activities. Documented attendance at an appropriate activity is usually required at least once every two years.

Because DAOs and DAEEs examine and report only on applicants’ vision, they are encouraged but not required to undertake appropriate training in aviation medicine. However, these practitioners are required to undertake continuing professional education approved by CASA. (CASA will accept evidence of completion of continuing professional education required by an appropriate professional college, association or registration authority as satisfying this requirement).
4. DAMEs resident in Australia are required to effect and maintain membership of the Aviation Medical Society of Australia and New Zealand/the Australasian Society of Aerospace Medicine.

5. DAOs and DAEEs resident in Australia are required to effect and maintain membership/associate membership, as appropriate, of the Aviation Medical Society of Australia and New Zealand/the Australasian Society of Aerospace Medicine.

6. All designated examiners should, as far as possible, be aware of the conditions in which applicants for medical certification are employed or operate. CASA encourages designated examiners to acquire practical experience of these conditions.

7. Designation is usually granted only to practitioners in full-time practice and for one address. Continued designation is subject to the terms set out in the application for appointment in Form 755.

1.1.5 Duration of Designation

CASA appoints DAMEs, DAOs and DAEEs for periods specified at the time of appointment. They are required to re-apply for appointment at the end of each such period.

Designation lapses if the designated examiner ceases to practise at the location for which he/she is appointed, unless CASA approves a changed practice location.

Designation lapses if the designated examiner fails to observe the relevant conditions of appointment as set out in Form 755.

Designation does not automatically extend to a designated examiner’s partners, assistants, locums or successors without prior CASA approval, which should be sought well in advance of any anticipated need. Designated examiners who wish to have other practitioners act in their stead should contact CASA to ascertain precise requirements. For DAMEs’ proposed locums, completion of an approved aviation medicine course is a prerequisite for approval. CASA does not usually approve locum appointments for periods of less than four weeks.
1.1.6 Duties and responsibilities of DAMEs

1. On becoming aware of any condition of potential aeromedical significance in the holder of or applicant for an aviation medical certificate, the DAME must notify CASA of full details within five working days. Note that certain minor conditions (see 1.4.5 Temporary Incapacity of Certificate Holders) need not be reported until the applicant’s next-following routine medical assessment. CASR 67.125 refers.

2. The DAME must be satisfied as to the identity of each applicant for medical certification. Unless the DAME personally knows the applicant, he/she must sight a photographic identity document of the applicant. Subsequently, the DAME is required to certify that he/she has formally identified each applicant. CASR 67.170 refers.

Note: It is prudent to remind applicants, when making appointments, of the need to bring photographic identification to their appointments.

3. The DAME is to answer the medical history questions in the medical assessment report, in conjunction with the applicant, and ensure that the applicant understands each such question.

4. The DAME is to examine personally each applicant presenting for examination, and record the results in the medical assessment report.

5. The DAME is to perform or arrange for any investigations or specialist assessments that are necessary for the examiner to be satisfied that the applicant meets the medical standard for the class of medical certificate sought. See Examiners With Farnsworth Lantern Testing Facilities on the CASA website.

6. The DAME is to comply with CASA’s directions concerning completion and lodgement of medical reports.

7. The DAME is to forward to CASA each medical report or ancillary report received concerning an applicant for medical certification. In usual circumstances, all such reports should be dispatched within 14 days of receipt unless the DAME has contacted CASA and a different schedule has been agreed.

8. The DAME is to ensure that the applicant signs the required statement on completion of the examination. Thereafter, the DAME is to complete his/her details on the statement, and forward it to CASA within the specified period. Under no circumstances should the statement be given to the applicant to dispatch to CASA.
9. The DAME is to maintain an up-to-date knowledge of the relevant civil aviation medical standards and techniques required by CASA and by ICAO, and also interpret these requirements for applicants for medical certification. In particular, the DAME is to acknowledge promptly advice from CASA on publication of DAME Newsletters or of changes to the DAME Handbook.

10. The DAME is to notify CASA promptly of any change of address, change of e-mail address, change of telephone number, or absence from practice for periods of four weeks or more.

11. The DAME is to display his/her certificate of appointment as a DAME in his or her professional rooms.

12. The DAME is to return his/her official stamp to CASA on cessation of appointment.

13. The DAME is to use his/her official stamp only for CASA-related purposes. In particular, it should not be used as a means of certifying completion of any medical examinations not required by CASA.

14. CASA requests that DAMEs inform the Authority of details when they learn of the death of any medical certificate holder. (Although this is not a requirement of appointment, such notice is useful for CASA’s monitoring of the health of Australia’s aviation workforce.)

### 1.1.7 Duties and Responsibilities of DAOs and DAEEs

**CASR 67.125**

1. On becoming aware of any condition of potential aeromedical significance in the holder of or applicant for an aviation medical certificate, the DAO or DAEE must notify CASA of full details within five working days. Note that certain minor conditions need not be reported until the applicant’s next-following routine medical assessment (see 1.4.5 Temporary Incapacity of Certificate Holders). CASR 67.125 refers.

**CASR 67.170**

2. The DAO or DAEE must be satisfied as to the identity of each applicant for medical certification. Unless the DAME or DAEE personally knows the applicant, he/she must sight a photographic identity document of the applicant. Subsequently, the DAO or DAEE is required to certify that he/she has formally identified each applicant. CASR 67.170 refers.

**Note:** It is prudent to remind applicants, when making appointments, of the need to bring photographic identification to their appointments.

3. The DAO or DAEE is to examine personally each applicant presenting for examination, and record the results in the eye examination report.
4. The DAO or DAEE is to comply with CASA’s directions concerning completion and lodgement of eye examination reports. See Examiners With Farnsworth Lantern Testing Facilities on the CASA website.

5. The DAO or DAEE is to ensure that the applicant signs the required statement on completion of the examination, enter his/her details on the statement, and forward it to CASA within the period specified.

6. The DAO or DAEE is to maintain an up-to-date knowledge of the relevant civil aviation medical standards and techniques required by CASA and by ICAO, and also interpret these requirements for applicants for medical certification. In particular, the DAO or DAEE is to acknowledge promptly advice from CASA on publication of DAME Newsletters or of changes to the DAME Handbook.

7. The DAO or DAEE is to notify CASA promptly of any change of address, change of e-mail address, change of telephone number, or absence from practice for periods of four weeks or more.

8. The DAO or DAEE is required to display his/her certificate of appointment as a DAO or DAEE in his or her professional rooms.

9. The DAO or DAEE is to return his/her official stamp to CASA on cessation of appointment.

10. The DAO or DAEE is to use his/her official stamp for CASA-related purposes only.

1.1.8 Facilities and Equipment

DAMEs are required to provide the facilities and equipment as set out in Form 755 under Conditions of Appointment of DAMEs – paragraph 5.

DAOs and DAEEs are required to provide appropriate facilities and equipment for eye examinations as required by CASA.

1.1.9 Powers under the Civil Aviation Regulations

The Civil Aviation Safety Regulations confer the following powers on DAMEs:

- Extension of the period in force of a current medical certificate, unless it bears the condition ‘Renew by CASA only’. Refer CASR 67.210.
Designated Aviation Medical Examiner's Handbook

1. Administrative Aspects

1.1 Introduction

Approved by Assistant Director, Aviation Safety Standards Version 3.0: December 2003

1.1.10 Responsibilities Under the Civil Aviation Regulations

The Civil Aviation Safety Regulations confer the following responsibilities on DAMEs:

- To comply with any applicable requirements contained in the DAME Handbook.
- To observe of the Code of Ethics of the Australian Medical Association.
- To attend appropriate continuing education activities relevant to their aviation medicine practice.
- To report to CASA within five working days any safety-relevant condition detected in an applicant.
- To complete and promptly forward to CASA a Notice/Declaration/Consent/Authorisation: Medical Certification of Applicants form in respect of each applicant examined. Note that part of this process requires the DAME to certify the identity of the applicant.

Further details appear in CASRs 67.060 and 67.170.

The Civil Aviation Safety Regulations confer the following responsibilities on DAOs and DAEEs:

- To comply with any applicable requirements contained in the DAME Handbook.
- To observe of the Code of Ethics of the Australian Medical Association or the Optometrists’ Association Australia, as appropriate.
- To report to CASA within 5 working days any safety-relevant condition detected in an applicant.
Further details appear in CASRs 67.080 and 67.170.

When CASA (or a DAME, DAO or DAEE) refers an applicant to a specified medical specialist of its / the referring practitioner’s choice for investigation and / or report, CASA expects that the medical specialist concerned will observe an appropriate, ethical level of professional impartiality. Supreme Court of the ACT Practice Direction No 3 of 2002 (and similar court directives issued in other Australian jurisdictions) provides relevant guidance. If in doubt as to requirements, referring professionals are invited to contact CASA Aviation Medicine Section to discuss the matter.

1.1.11 Protection Under the Civil Aviation Regulations

Civil Aviation Safety Regulations provide complete indemnification against civil or criminal liability for any medical practitioner or other nominated person or organisation that, in good faith, performs an indemnified act in accordance with the Regulations. Refer CASR 67.140.

For this purpose, ‘an indemnified act’ means any act whereby a DAME, other medical practitioner or other specified person (including a DAEE) advises CASA of any concerns over the ability of a medical certificate holder or applicant to meet a required medical standard for such certification. CASA requires such advice to be provided in writing.

1.1.12 Fees

CASA does not set or recommend fees for general DAME, DAO or DAEE examinations.

In the case of CASA employees who are required to hold aviation licences to perform their duties and are thus entitled to reimbursement from CASA for the cost of examinations and any related tests, CASA will reimburse fees determined as reasonable by the CASA PMO. In general, CASA will accept as reasonable, fees that closely approximate the fees recommended in the current edition of the *AMA List of Medical Services & Fees*. Any additional amounts will be the responsibility of the examinee. In cases of doubt or unusual complexity, examiners are invited to discuss the matter with the CASA PMO. Note that CASA will not accept responsibility for any treatment expenses incurred by its employees arising from findings in the course of routine assessments for medical certification.

When presenting for assessment, CASA employees should either present a CASA claim for payment form, with details of where to send it to obtain payment, or personally pay for the consultation and claim reimbursement from CASA. Examiners should not send accounts to Aviation Medicine Section unless this has been previously agreed as the result of a specific request from Aviation Medicine Section.
Where a DAME has been required to expend additional time and effort for a CASA employee in arranging specialist referrals or investigations, obtaining and interpreting copies of reports, or on similar activities, an approach to the CASA PMO for a higher-than-normal fee may be considered.

**Additional Examinations**

Where additional consultations or investigations are necessary to ascertain if an applicant for medical certification meets the required medical standard, the applicant is usually responsible for meeting any costs involved. If such tests are undertaken principally for screening purposes, they will not generally be eligible for rebate from the Health Insurance Commission (HIC). However, if additional tests are required to elucidate a health problem for which medical opinion, investigation or treatment is clinically necessary, these should be rebatable. Affected applicants should be advised to discuss their individual cases with the HIC.

In the case of CASA employees who are required to hold aviation licences to perform their duties and are thus entitled to reimbursement from CASA for the cost of examinations and any related tests, CASA will reimburse fees determined as reasonable by the CASA PMO for additional consultations or investigations necessary to ascertain if the employee meets the required medical standard. In general, CASA will accept as reasonable, fees that closely approximate the fees recommended in the current edition of the *AMA List of Medical Services & Fees*. Any additional amounts will be the responsibility of the examinee. Note that CASA will not accept responsibility for any treatment expenses incurred by its employees arising from findings in the course of routine assessments for medical certification.
1.2.1 Licences – General

Aircrew and air traffic services licences are issued to applicants who have met the relevant technical and theoretical standards. Once a licence is issued, it continues in effect indefinitely. A valid medical certificate appropriate for the class of licence must accompany the licence for the licence holder legally to exercise the privileges of the licence.

1.2.2 Classes of Medical Certificates for Licence Types

There are three medical standards relating to the various types of licences held. These three standards relate to Class 1, 2 and 3 Medical Certificates.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Applicable to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>All professional technical aircrew of powered aircraft, and is required for issue of Airline Transport Pilot Licence, Commercial Pilot Licence, Flight Engineer or Flight Navigator Licences.</td>
</tr>
<tr>
<td>Class 2</td>
<td>Student Pilot, Private Pilot, Commercial Pilot Balloons and Flight Radio Operator Licences.</td>
</tr>
<tr>
<td>Class 3</td>
<td>Air Traffic Control staff.</td>
</tr>
</tbody>
</table>

1.2.3 Duration of Validity

See 1.4.7 Special Periodic Examinations Required.

Unless otherwise advised by the Aviation Medicine Section:

| Class 1 | Medical Certificate is valid for one year (but see 1.4.7 Special Periodic Examinations Required). |
| Class 2 | Medical Certificate is valid for four years, for applicants less than 40 years of age on the day of issue, and in all other cases for two years. |
| Class 3 | Medical Certificate is valid for two years. |

Where an applicant’s medical condition is under review, the duration of Medical Certificate validity may be varied at the discretion of the Principal Medical Officer.
### Special Reports and Tests Required for Medical Certification

<table>
<thead>
<tr>
<th>Class</th>
<th>Initial Issue</th>
<th>Renewals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class 1</strong></td>
<td><strong>Initial Issue</strong></td>
<td><strong>Renewals</strong></td>
</tr>
<tr>
<td></td>
<td>ECG, audiogram, estimation of fasting serum lipids and fasting blood glucose and an examination by CASA Designated Aviation Ophthalmologist.</td>
<td>ECGs are required at the first renewal after the 25th, 30th, 32nd, 34th, 36th, 38th and 40th birthdays, and annually thereafter. Audiograms are required at the first renewal after the 25th birthday and every fifth birthday thereafter. Estimation of fasting serum lipids and of fasting blood glucose is required at the first renewal after the 25th birthday and every fifth birthday thereafter. Examination by CASA Designated Aviation Ophthalmologist at age 60 and at two-yearly intervals thereafter.</td>
</tr>
<tr>
<td><strong>Class 2</strong></td>
<td>Where an applicant for original medical certification has a visual acuity &lt; 6/60 in either eye, an ophthalmic report from an ophthalmologist or optometrist (preferably a DAO or DAEE) is required. There are no other special requirements, except where an examiner determines a clinical indication exists.</td>
<td></td>
</tr>
<tr>
<td><strong>Class 3</strong></td>
<td>Initial Issue</td>
<td>Renewals</td>
</tr>
<tr>
<td></td>
<td>ECG, audiogram, estimation of fasting serum lipids and fasting blood glucose and an examination by CASA Designated Aviation Ophthalmologist.</td>
<td>ECGs are required at the first renewal after the 25th and 30th birthdays and every two years thereafter, ie, at every subsequent routine examination. Audiograms are required at the first renewal after the 25th birthday and then at each renewal after every fifth successive birthday. Estimation of fasting serum lipids and of fasting blood glucose is required at the first renewal after the 25th birthday and then at each renewal after every fifth successive birthday. Examination by CASA Designated Aviation Ophthalmologist at age 60 and at two-yearly intervals thereafter.</td>
</tr>
</tbody>
</table>

See also section 1.4.1 Electrocardiographs.
1.3.1 General Matters

From 2003, CASA has adopted a medical assessing system intended to automate the process of medical certification to the greatest extent practicable. The technological platform for this process is a computer-based system known as the CASA Medical Records System Online (MRS Online). Intended future development of MRS Online will further improve the speed and accuracy of medical certification.

Once MRS Online became fully operational, CASA decommissioned the former paper-based medical reporting system, which relied on optical scanning to capture and store data from routine medical assessments. CASA no longer maintains a capability to process paper-based routine reports of medical assessments. Consequently, any paper-based medical examination and report forms received are returned to the originator and a notice sent to the examinee advising him/her that the medical report has not been processed and that another is required. Note that further exercise of licence privileges is not permitted until medical certification via MRS Online is complete.

Pending further development of MRS Online, hard copies of applicant statement and examiner certification forms are still required.

CASA continues to accept hard copies of other medical reports, particularly ECGs, because of the time taken to transmit such documents electronically from some computer servers. However, CASA’s preference is for such documents to be scanned and transmitted electronically as attachments to the medical assessment form. In the near future, this will become the only available means for their lodgement.

If, for any reason, an examiner is unable to transmit a medical assessment form to CASA electronically, it is temporarily possible for an examination form to be mailed to the examiner on diskette. Once completed, the diskette can be returned and CASA can then load it manually into MRS Online. CASA does not intend to support this option in the long term because it vitiates many of the efficiency benefits available from MRS Online.

1.3.2 Medical and Ophthalmological Assessment Forms

Prior to undertaking any aeromedical examination, the examiner is to inform each applicant of the possible legal consequences of a deliberate false statement made with the intention of obtaining a medical certificate (see CASR 67). Thereafter, the examiner should obtain the applicant’s signature and complete the applicant statement and examiner certification form and record all relevant historical details obtained from the applicant.
CASA requires that the DAME personally ask the applicant the questions in the medical history section of the medical assessment report, then personally record the answers given. This allows the DAME to assess the applicant’s understanding of the questions and to provide any necessary explanations.

CASA similarly requires that the DAO/DAEE personally ask the applicant the questions in the medical history section of the eye assessment report, and personally record the answers given. This allows the DAO/DAEE to assess the applicant’s understanding of the questions and to provide any necessary explanations.

Slightly different historical data are required from applicants for original medical certification, where fuller details are sought, and from applicants for renewal medical certification. MRS Online automatically generates the appropriate questionnaire for each examination on the basis of its own records and/or input data.

MRS Online automatically generates an original medical history questionnaire whenever a period of 5 years or longer has passed since the applicant’s last medical assessment report.

Where the holder of an existing class 2 medical certificate applies for medical certification at class 1 or 3 level, MRS Online will automatically generate an original medical history questionnaire.

1.3.3 The Medical Certificate

Civil Aviation Safety Regulations require an aviation licence holder to have a current, valid medical certificate appropriate to the class of licence held in order to validate the licence holder’s exercise of privileges conferred by the licence. That is, in order to exercise the privileges of an aviation licence, the licence holder must have both a licence and a valid medical certificate for the class of licence.

The medical certificate confirms that the applicant has been medically assessed, details the class of medical certificate held, the validity date, and confirms either that the required medical standard is met or details of any restrictions imposed by CASA which affect the medical certificate’s validity and therefore the use of the licence (refer 1.5.2 Frequently Used Conditions Endorsed on Medical Certificates). For professional licence holders, it also notes the dates of most recent additional examinations required (refer 1.4.6 Additional Investigations and Specialist Opinions).
DAMEs are not authorised to issue interim original medical certificates. Where permitted by Civil Aviation Safety Regulations (see CASR 67.220 and 67.225) they may revalidate an existing current medical certificate or one that has expired for less than three months (see following Section). Legally, every medical certificate is a new medical certificate. The ‘new’ medical certificates issued by DAMEs under provisions of CASR 67.225 actually refer to revalidated medical certificates that have expired for less than three months.
1.3.4 Medical Certificate Revalidation

Obtain and send the applicant declaration to CASA

Complete medical assessment using online medical form

Are specialist reports required?

Yes

Obtain and send the specialist reports to CASA

No

Are you able to submit medical now?

Yes

Submit online medical form

No

Does the certificate contain a condition to ‘Renew by CASA only’?

Yes

Do you consider the applicant meets the standard?

No

Do not validate certificate

Yes

Revalidate certificate

No

Does emailed assessment report meet the standard?

Yes

No

DAMEs are not permitted to revalidate medical certificates endorsed ‘Renew by CASA only’. Affected applicants are encouraged to return to the DAME for early review, leaving adequate time for CASA to receive the periodic medical assessment and any other required reports and to make a determination on fitness for renewed medical certification.
On completion of the medical assessment, provided that the applicant appears to meet the required medical standard and provided the medical certificate has not been endorsed ‘Renew by CASA only’, the DAME may revalidate an applicant’s medical certificate only, as follows (refer CASR 67.220):

- If the applicant’s medical certificate has not expired and the assessment is conducted more than 28 days before the expiry date shown on the certificate—for up to two calendar months from the date of the assessment. (But see ‘Exception for ATPL recertification’ below).

- If the applicant’s medical certificate has not expired and the assessment is conducted within 28 days preceding the expiry date shown on the certificate—for up to two calendar months beyond the expiry date shown on the certificate.

- If the applicant’s medical certificate has expired, and the assessment is conducted within three calendar months of the expiry date shown on the certificate—for up to two calendar months from the date of the assessment.

To revalidate the medical certificate, the following endorsement is required:

‘Examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (the appropriate date to be inserted is determined according to instructions in the preceding paragraph):

DAME’s signature, date, DAME stamp.

**Note:** Any specialist assessments required in connection with a medical certificate renewal examination need not be performed within 28 days preceding the medical certificate’s expiry date. Guidance on CASA’s usual approach to currency of specialist reports and other investigations appears under 1.8 Frequently Asked Questions.

**Exception for ATPL recertification.**

Some CASA medical standards differ from those required by ICAO (refer Section 2.15). In particular, ATPL holders aged over 40 but under 60 may receive Australian class1 medical certification for 12 months, while ICAO countenances only six months. Because many of this group operate on international routes, CASA advises (and airlines require) that their medical certification is ICAO compliant.
Such applicants will often return for reassessment within the first 6 months of a medical certificate, which is valid for 12 months. In this circumstance, the DAME should endorse the applicant’s medical certificate as follows.

‘Re-examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (this will usually be the date 2 months after the assessment date)
signature, date, DAME stamp

Subsequently, in the usual course of events, CASA will issue a new class 1 medical certificate valid for a further 12 months from the date of assessment. Alternatively, CASA may issue a new medical certificate that has the effect of extending validity for six months longer than the current certificate’s expiry date. This situation will persist while ever the medical certificate holder operates as an ATPL in international air space.

**Note:** There are a number of other differences between CASA and ICAO medical standards. These particularly concern the periods of validity for medical certificates and the frequency of certain routinely required investigations or examinations. Full details likely to be of relevance to Australian examiners will be notified from time to time in *DAME Newsletters*. Those currently of interest are shown in section 2.15 of this manual. For practical purposes, only medical certificate holders who intend to exercise the privileges of licensure in other ICAO contracting states will be affected by these differences.

### 1.3.5 Assessments Other than Pass Assessments

Only CASA’s Principal Medical Officer (PMO) has the delegated power to cancel an applicant’s medical certificate(s).

Only CASA’s PMO and other CASA medical staff have the delegated power to suspend an applicant’s medical certificate(s).

A DAME may only revalidate the medical certificate of an applicant who appears to meet the required medical standard and where the medical certificate does not bear the endorsement ‘Renew by CASA only’. If a DAME has any concerns about an applicant meeting the required medical standard, he/she must decline to revalidate the medical certificate and refer the matter to CASA for determination. Relevant specialist opinions and/or investigations should be obtained and the results forwarded to CASA, together with the DAME’s opinion concerning the applicant’s fitness for certification.
To assist CASA’s consideration of applicants where there is doubt about ability to meet the required medical standard, DAMEs should avoid vague descriptive terms in their reports. Expressions such as ‘brief’, ‘infrequent’, ‘mild’, ‘some’ or similar convey no meaningful information. CASA recommends the “6W mnemonic”.

WHAT 1: What happened? (Detail signs and symptoms that led to the consultation, procedure performed etc).

WHAT 2: What were the sequelae?

WHEN: What were the dates and frequency?

WHERE: What body part was affected? (Left or right, upper arm/forearm etc).

WHY: Why was a procedure performed?

WHO: Who was involved? (Who carried out a procedure/made an assessment/is undertaking follow up, etc).

Once all necessary information has been received, CASA then submits full details of the case to a panel composed of aviation medicine practitioners. When appropriate, this panel may be supplemented by clinical or other specialists. A determination on the case will then be made and the applicant notified of the result.

If an applicant is dissatisfied with the panel’s determination, a review may be requested and/or the matter may be appealed to the Commonwealth Administrative Appeals Tribunal.

1.3.6 Identification of CASA Examiners (DAMEs, DAOs and DAEEs)

Each designated examiner (including approved locum examiners) requires an individual Aviation Reference Number (ARN), which must be obtained from CASA – refer Form1162.

CASA issues a unique identification stamp to each DAME. Each stamp carries a state or territory based code (‘A’ for ACT, ‘Q’ for Queensland etc, or ‘I’ for International) plus a three-digit number. Similarly, CASA issues a unique identification stamp to each DAO or DAEE. These also carry an alphanumeric code designating the state or territory plus a restriction limiting examinations to applicants’ eyes (‘SE’ for South Australia, ‘VE’ for Victoria, ’IE’ for International, etc). Each stamp is intended for the exclusive use of the individual examiner to whom it is issued and, except as provided hereafter, must not be loaned to or used by any other practitioner without prior approval by the CASA PMO.

When CASA has approved a locum to act for a DAME, DAO or DAEE, the locum is to use the appropriate principal examiner's stamp and also identify himself/herself as a locum in accordance with CASA procedures.
Locums

Locum approval must be obtained in writing from CASA prior to the dates requested. CASA requires a written request including the requested date, the contact details and signature of the proposed locum and the CV of the proposed locum. Once locum approval is gained in writing, the locum is able to perform aviation medical examinations and/or ophthalmological examinations using the existing stamp and writing ‘locum’ next to the stamp within the requested dates.

Locums are viewed the same as DAMEs and DAOs in terms of indemnification, rights and responsibilities. Locums are required to abide by the Conditions of Appointment.

CASA also issues DAME stamps to occupants of certain identified positions who otherwise meet the requirements for appointment as DAMEs (refer CASR 67). These are senior medical positions in the Australian Defence Force (ADF) or Royal Flying Doctor Service (RFDS). Whenever an approved ADF or RFDS medical officer performs a medical assessment under the auspices of one of these identification stamps, details of the individual examiner are also required. Thus it is only possible for ADF or RFDS medical staff who have registered with CASA to perform medical assessments under the auspices of one of these stamps.

The DAME/DAO/DAEE stamp plus the examiner’s ARN must be inserted on all applicant consent and examiner certification forms before their dispatch to CASA, together with signatures of the applicant and of the examiner.

Examiners’ identification stamps should be stored securely when not in use. The unique identification number on each stamp should be used in all correspondence between the examiner and CASA.
1.4.1 Electrocardiographs

Routine electrocardiographs are required at specified intervals for class 1 and class 3 medical certification. They may also be required on clinical grounds (see Section 2.2).

All ECGs sent to CASA are to be mounted on A4 paper and must contain the following information.

- Applicant’s full name
- Applicant’s ARN
- Date of recording.

Leads should be marked on the trace and the calibration mark should be clearly visible. The tracing should be performed using standard calibration (10 mm/mV). If half calibration is needed to clarify the standard trace, both should be sent to CASA. ECGs with slurred or incorrect calibration are not acceptable.

When self-reporting ECG machines are used, the reports are to be included with the tracings.

Where an ECG is known to be abnormal, copies of the previous ECG or reference to it (particularly regarding any changes) would be helpful and should speed CASA’s evaluation of the applicant.

Note that reports (whether by the DAME or other interpreter) should accompany all ECGs sent to CASA. Except for those already reported on by an approved specialist or interpreted by a self-reporting machine, CASA will arrange for a cardiologist to report on all ECGs. This process requires up to a week.

In future, CASA anticipates enabling on-line submission of ECGs via enhanced MRS Online. By then, CASA will likely require that all ECGs are reported on by a self-reporting machine, or interpreted and reported on by a cardiologist, physician or other specialist approved by CASA.

The DAME should also examine all ECGs and assess them as normal or abnormal, then provide details of any abnormality detected in the medical report.

Original issue ECGs performed for class 1 and class 3 applicants should be dispatched to CASA immediately following the examination. The DAME should read, assess and retain any future ECGs performed, except:

- At the first renewal after a class 1 or class 3 applicant’s 25th birthday and at designated intervals thereafter (refer to 1.4.7 ‘Special periodic Medical Examinations Required’), when copies are required for the applicant’s medical record maintained by CASA; and
- Any abnormal ECG must be sent to CASA, together with a cardiologist’s or other specialist’s report as appropriate.
1.4.2 Audiograms

The pure-tone audiogram performed by a DAME or any other person is treated by the Aviation Medicine Section as a screening test only, and is never used as the final arbiter of an applicant's ability to meet the hearing requirements for a Medical Certificate. Audiograms performed by DAMEs are acceptable. However, any audiometer used for CASA-required audiograms must have been calibrated within two years of the date of such examinations.

The audiogram result is to be stated in the medical assessment form even when a printed results slip is included with the form when lodged.

DAMEs should enclose the audiogram result printout with the medical assessment forms for all original Class 1 and Class 3 applicants.

1.4.3 Special Hearing Tests

Where a supplementary speech test is required, this can only be performed by AHS as the calibrated tapes and other equipment required are not available elsewhere. If the applicant fails the speech-based hearing test, in some cases an in-flight test may be offered if he/she has a high level of aeronautical experience. Such an operational check will involve evaluation of relevant aspects of the applicant's hearing by a CASA Flying Operations Inspector or an Authorised Testing Officer with test material transmitted from a control tower. Ideally the test should be conducted in the class of aircraft that is the same as that which the applicant normally operates.

Further information is available from CASA Aviation Medicine Section.

1.4.4 Assessment by Designated Aviation Ophthalmologists or Designated Aviation Eye Examiners

An applicant for original class 1 or class 3 medical certification requires routine assessment and reporting by a DAO or DAEE.

A class 1 applicant who has attained the age of 60 years requires further routine assessment and reporting by a DAO or DAEE. Further assessments are required at intervals of every two years thereafter (refer Section 1.4.7 'Special periodic medical examinations required').

Any applicant for original medical certification who fails to meet the required visual standard also requires assessment and reporting by an ophthalmologist or optometrist, usually a DAO or DAEE. CASA will determine subsequent requirements on a case-by-case basis.
Where a DAME detects or suspects ophthalmic pathology in any applicant for medical certification, referral to a DAO for further assessment is required.

A small number of experienced class 3 medical certificate holders have been 'grandfathered' so as to retain their medical certification, despite being unable to meet the colour vision requirements of the class 3 standard.

### 1.4.5 Temporary Incapacity of Certificate Holders

Refer CASR 67.265 and CASR 67.270.

CASA requires medical certificate holders who experience any medically significant changes in medical condition to inform CASA or a DAME of such changes.

The information is required to be conveyed to CASA or a DAME after the applicant has been aware of the change:

- For a class 1 medical certificate holder, for longer than 7 days
- For a class 2 medical certificate holder, for longer than 30 days
- For a class 3 medical certificate holder, for longer than 30 days.

Thereafter, the DAME so informed is required to notify CASA of the matter within 5 working days. Refer CASR 67.125.

A licence holder must not perform any act authorised by the licence while he or she has a medically significant condition which impairs his or her ability to do the act. Before resuming the exercise of privileges under the licence, the licence holder must obtain prior confirmation of fitness from a DAME, as follows:

- For a class 1 licence holder, where the medically significant condition has been present for longer than 7 days
- For a class 2 licence holder, where the medically significant condition has been present for longer than 30 days
- For a class 3 licence holder, where the medically significant condition has been present for longer than 30 days.
A DAME usually need not perform a full medical examination in these circumstances, but should satisfy himself/herself that the applicant has recovered from the illness, injury or other medically significant condition and meets the required medical standard for exercise of the privileges of any licence held. Therefore, a DAME should not issue a medical certificate of the ‘X will be fit for duty from some later date’—type in anticipation of full recovery sufficient to meet the required medical standard.

Licence holders who fail to observe these requirements may be subject to heavy penalties, so DAMEs should take every opportunity to emphasise these legal requirements to them.

Certain trivial conditions in medical certificate holders need not be reported to CASA unless present at an applicant’s routine medical assessment. However, DAMEs are to advise applicants that these conditions must have resolved fully, without sequelae, prior to applicants resuming the exercise of privileges. Common examples include the following:

- Influenza, coryza, other URTI
- Cough in the absence of wheezing
- Sinusitis
- Occasional, mild headaches
- Uncomplicated urinary tract infection
- Gastroenteritis
- Uncomplicated haemorrhoid(s) if not bleeding and requiring only symptomatic treatment
- Mild allergic rhinitis, if no nasal blockage present and no antihistamine treatment required
- Minor soft tissue injuries without residual pain
- Muscular pain of short duration not requiring long-term medication and not related to any significant underlying chronic illness
- Dysmenorrhoea not requiring medication or absence from work
- Treated chronic fungal nail infections
- Dental extractions.

1.4.6 Additional Investigations and Specialist Opinions

The DAME should refer an applicant (or arrange referral through the applicant’s usual general practitioner) for appropriate specialist review(s) and/or other investigations whenever a significant abnormality in the history or physical examination of an applicant is detected. The purpose of such review or investigation is to clarify whether the applicant meets the required standard(s) for medical certification, or whether medical certification with appropriate conditions is compatible with the safety of air navigation.
Once the DAME has collated all relevant investigations and reports concerning the applicant, these should be sent to CASA, together with the DAME’s own assessment of whether the applicant meets the required standard(s) for medical certification, or whether medical certification with appropriate conditions is compatible with the safety of air navigation.

Where an applicant fails to return for follow up or completion of the assessment is delayed for more than one month for any reason, the DAME should forward to CASA advice of the situation and copies of any reports available. Thereafter, in the event of further delays, or of the applicant failing to return for review, the DAME should advise CASA as then appropriate. Written, faxed or e-mailed advice is required in these circumstances.

**Note:** MRS online will automatically capture incomplete medical examinations and highlight them for CASA’s attention 14 days after the examination has begun. CASA may then contact the DAME for an explanation of the circumstances surrounding the delayed completion of the assessment.
1.4.7 Special Periodic Examinations Required

<table>
<thead>
<tr>
<th>Certificate</th>
<th>Frequency</th>
<th>Requirements on Initial Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1 ATPL</td>
<td>12-monthly until age 60, then 6-monthly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
<tr>
<td>Class 1 CPL</td>
<td>12-monthly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
<tr>
<td>Class 2</td>
<td>Four-yearly until age 40, then two-yearly</td>
<td>FEV₁</td>
</tr>
<tr>
<td>Class 3</td>
<td>Two-yearly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
</tbody>
</table>

Examinations are as follows:

<table>
<thead>
<tr>
<th>Audio</th>
<th>Hearing test — audiogram</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye</td>
<td>Specialist eye examination</td>
</tr>
<tr>
<td>ECG</td>
<td>Electrocardiogram</td>
</tr>
<tr>
<td>Serum Lipids</td>
<td>Total Cholesterol (fasting), HDL and LDL fractions</td>
</tr>
<tr>
<td>Blood Glucose</td>
<td>Blood Glucose (fasting)</td>
</tr>
<tr>
<td>Stress ECG</td>
<td>Exercise ECG on Bruce Protocol (no requirement for cardiologist referral)</td>
</tr>
<tr>
<td>FEV₁</td>
<td>Peak Flow (range is within 30% of the predicted value for height, sex and age – refer chart Peak Expiratory Flow in Normal Subjects)</td>
</tr>
</tbody>
</table>

Notes:

1. All ECGs performed in connection with medical examinations marked with an asterisk (*) in the ‘Age’ column in the Class 1 and 3 table below are to be forwarded to the Aviation Medicine Section.

2. All abnormal ECGs are to be forwarded to the Aviation Medicine Section with medical assessment forms.

3. Each applicant for a class 1 or class 3 medical certificate who scores 15 or more points on the American Heart Association Coronary Heart Disease Prediction Chart must undergo a stress ECG in accordance with the instructions at Section 2.2.6.
(Notes: Contd)

4 Each applicant for a class 1 or class 3 medical certificate should have his/her risk score calculated at the original medical examination, then at the first medical examination after age 25, thereafter every 5 years until age 60, thereafter annually.

5 Fasting serum lipid estimations must include total cholesterol, high and low density lipoprotein cholesterol fractions: be certain to specify this on the pathology request form as an ‘Occupational Requirement’. (This alerts the pathology laboratory that the investigation is not HIC rebatable and usually ensures it will be performed, even when other lipid values are within normal limits).

6 On occasions, applicants may have undergone certain of these tests or specialist reviews independently of the CASA requirement. CASA will accept certified true copies of recent results (only). Guidance on acceptable recency is contained in Section 1.8. Frequently Asked Questions.
### Classes 1 and 3 Additional Requirements

The table below gives the additional tests/examinations that are required at each renewal examination for applicants for **Class 1 and 3** Medical Certificates. Requirements for applicants aged more than 80 years will be advised individually.

<table>
<thead>
<tr>
<th>Age</th>
<th>Tests/Examinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>25*</td>
<td>Audio Serum Lipids and Blood Glucose ECG</td>
</tr>
<tr>
<td>30*</td>
<td>Audio Serum Lipids and Blood Glucose ECG</td>
</tr>
<tr>
<td>32</td>
<td>ECG</td>
</tr>
<tr>
<td>34</td>
<td>ECG</td>
</tr>
<tr>
<td>35</td>
<td>Audio Serum Lipids and Blood Glucose ECG</td>
</tr>
<tr>
<td>36*</td>
<td>ECG</td>
</tr>
<tr>
<td>38</td>
<td>ECG</td>
</tr>
<tr>
<td>40*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td></td>
<td>An ECG is required <em>yearly</em> from age 40 to 80 for Class 1 and every <em>two years</em> for Class 3 (see note 3 (above) re stress ECG)</td>
</tr>
<tr>
<td>45*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>50*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>55*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>60*</td>
<td>Audio Serum Lipids and Blood Glucose Eye</td>
</tr>
<tr>
<td>62*</td>
<td>Eye</td>
</tr>
<tr>
<td>64*</td>
<td>Eye</td>
</tr>
<tr>
<td>65*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>66*</td>
<td>Eye</td>
</tr>
<tr>
<td>68*</td>
<td>Eye</td>
</tr>
<tr>
<td>70*</td>
<td>Audio Serum Lipids and Blood Glucose Eye</td>
</tr>
<tr>
<td>72*</td>
<td>Eye</td>
</tr>
<tr>
<td>74*</td>
<td>Eye</td>
</tr>
<tr>
<td>75*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>76*</td>
<td>Eye</td>
</tr>
<tr>
<td>78</td>
<td>Eye</td>
</tr>
<tr>
<td>80</td>
<td>Audio Serum Lipids and Blood Glucose Eye</td>
</tr>
<tr>
<td>&gt; 80</td>
<td>Requirements advised individually.</td>
</tr>
</tbody>
</table>
1.4 Special Investigations

1.4.8 Other Special Examinations

Applicants for class 1 or class 2 medical certification who fail the Ishihara Pseudoisochromatic Plates (PIP) colour vision test are to be referred to a centre that conducts Farnsworth Lantern (FALANT) testing. Applicants for class 1 or class 2 medical certification who fail the Farnsworth Lantern tests are to be referred for practical signal light testing. Contact CASA Aviation Medical Section on 131 757 (toll free) or 02 6217 1641 (direct), for details of how to arrange this testing. Note that colour vision testing for these applicants is to follow the sequence PIP → FALANT → practical signal light testing. A pass on any of these tests will satisfy the requirements for issue of an unrestricted class 1 or class 2 medical certificate.

New applicants for class 3 medical certification are required to pass the Ishihara PIP colour vision test. No additional or alternative colour vision testing is available for this group. A small number of experienced class 3 medical certificate holders have been ‘grandfathered’ so as to retain their medical certification, despite being unable to meet the colour vision requirements of the class 3 standard.

For certain applicants, routine periodic urinalysis for drugs is a requirement of continued medical certification. It is medico legally essential that such testing be performed in accordance with a specified protocol. This protocol will be notified in due course.
1.5.1 General

Whenever appropriate, CASA places a condition or conditions of use on an applicant’s medical certificate(s) which influences the validity of the medical certificate(s). Multiple conditions may be placed on a medical certificate, and different conditions may be placed on different classes of medical certificate held by an individual.

1.5.2 Frequently Used Conditions Endorsed on Medical Certificates

<table>
<thead>
<tr>
<th>Endorsement</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renew by CASA only.</td>
<td>The DAME may not revalidate the medical certificate. Any revalidation or renewal is the prerogative of CASA Medical staff</td>
</tr>
<tr>
<td>Visual correction required.</td>
<td>Applicant requires visual correction in order to meet the visual standard. Appropriate correction must be worn when exercising the privileges of the licence. (Class 3 certificates only).</td>
</tr>
<tr>
<td>Assured Visual Correction Required</td>
<td>Applicant requires visual correction in order to meet the visual standard. Appropriate correction must be worn and a spare pair of prescription spectacles must be carried/readily available when exercising the privileges of the licence.</td>
</tr>
<tr>
<td>Near Vision Correction</td>
<td>Applicant requires visual correction in order to meet the near vision standard. Appropriate correction must be readily available and a spare pair of prescription spectacles carried/readily available when exercising the privileges of the licence.</td>
</tr>
<tr>
<td>Not valid for mustering or agricultural flying.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Valid in Australian Airspace only.</td>
<td>This endorsement indicates that the medical certificate is issued despite the holder’s failure to meet a required medical standard, as the safety of air navigation is not adversely affected. Use in any other ICAO contracting state requires specific advance approval by the Regulator for that state.</td>
</tr>
<tr>
<td>Valid in Australian airspace Only, valid up to and Including CPL</td>
<td>Self-explanatory</td>
</tr>
<tr>
<td>Endorsement</td>
<td>Interpretation</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Not valid for ATPL operations.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Not valid for rotary wing operations.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Special conditions apply</td>
<td>Detailed, individually determined conditions are provided</td>
</tr>
<tr>
<td>Special conditions apply, Notified in accompanying letter dated dd/mm/yyyy</td>
<td>Detailed, individually determined conditions are set out in the referenced letter, which must be carried with the medical certificate whenever exercising the privileges of the licence</td>
</tr>
<tr>
<td>Holder to fly as or with a qualified co-pilot.</td>
<td>Refer 1.5.3 Multi-Crew Endorsement</td>
</tr>
<tr>
<td>Holder is required to inform employer of the nature and extent of his/her medical impairment and to co-operate in establishing mitigation strategies to minimise the effect of this impairment</td>
<td>Self-explanatory (Class 3 certificates only).</td>
</tr>
<tr>
<td>Holder may exercise the privileges of the licence without supervision, but there must at all times be another licensed air traffic controller who is aware of the holder’s impairment present and able to assume the holder’s air traffic management duties should the holder experience sudden incapacitation</td>
<td>Self-explanatory (Class 3 certificates only.)</td>
</tr>
</tbody>
</table>
1.5.3 Multi-Crew Endorsement

CASA uses multi-crew endorsements as a means of risk mitigation. Their use enables pilots to continue flying and air traffic control staff to continue duty despite the presence of medically-significant conditions which would otherwise pose an unacceptable risk to the safety of air navigation.

When a class 1 or class 2 medical certificate is endorsed with the condition ‘Holder to fly as or with a qualified co-pilot’, all of the following conditions apply:

1. The holder is restricted to operating either as or with a qualified co-pilot while exercising the privileges of the licence validated by the medical certificate. (Note that it is sometimes possible for an applicant to have an ‘as or with co-pilot’ restriction on a class 1 medical certificate but an unrestricted class 2 medical certificate).

2. Aircraft requirements:
   a. side-by-side seating in the cockpit
   b. fully functioning dual controls.

3. Certificate holder requirements:
   a. to wear shoulder restraint harness at all times
   b. to be prepared to relinquish command or control of the aircraft at the onset of any incapacity
   c. to ensure that the other pilot has read the requirements in this document.

4. Other pilot’s requirements:
   a. to occupy a control seat except for short absences in transport category aircraft in the cruise with the autopilot engaged
   b. to hold command endorsement for the aircraft
   c. to be current and appropriately rated for the flight
   d. to be aware of the type of incapacity the pilot may suffer in flight
   e. to be prepared to take command of the aircraft should the other pilot be unable to continue command.

**Note:** This condition does not:

a. Preclude the medical certificate holder from being left on the flight deck alone in a 2-pilot operation; or
b. limit the medical certificate holder from operating in a 2-pilot operation with another individual who has a medical certificate with this restriction; or

C. preclude the medical certificate holder from operating as a single pilot on a flight deck should the other pilot in a 2-pilot operation become incapacitated.
When a class 3 medical certificate is endorsed with the condition ‘Holder is required to inform employer of the nature and extent of his/her medical impairment and to co-operate in establishing mitigation strategies to minimise the effect of this impairment’, the following applies:

The holder who has such a restriction on a class 3 medical certificate is required to inform his/her employer of the nature and extent of his/her medical impairment and to co-operate with the employer in establishing strategies to minimise the risk of his/her impairment causing acute incapacitation. Relevant strategies may include, but are not limited to, measures such as special roster or shift arrangements, specified meal breaks, or guaranteed access to prescribed facilities.

When a class 3 medical certificate is endorsed with the condition ‘Holder may exercise the privileges of the licence without supervision, but there must at all times be another licensed air traffic controller who is aware of the holder’s impairment present and able to assume the holder’s air traffic management duties should the holder experience sudden incapacitation’, the following applies:

The holder who has such a restriction on a class 3 medical certificate is not permitted to undertake duty alone and is required to ensure, at the beginning of each shift, that his/her co-workers are aware of the type of incapacity the individual may experience while working and that at least one co-worker is available at all times to take over the individual’s air traffic management duties should such a sudden incapacitation eventuate.
1.6.1 General Matters

Procedures for dispatching routine medical assessment reports to CASA will be detailed in the MRS Online Program Manual currently under development.

**Applicant statement and examiner certification forms** should be forwarded to CASA as soon as possible following completion. On receipt, they will be scanned and attached to applicants’ medical files. (Note: CASA intends to develop more efficient alternatives to this procedure in subsequent versions of MRS Online).

ECG recordings, pathology and imaging reports and specialist consultation reports, as hard copies, should be forwarded to CASA as soon as possible following completion or when received by the examiner. Legible scanned copies of such documents may also be sent to CASA as attachments to medical assessment reports submitted online.

Lossy compression graphic formats such as JPEG should not be used because of the loss of information that accompanies the compression process. Do not attempt report scanning unless certain of the properties of the format used. CASA Aviation Medicine Section will provide further advice on request. (Note: CASA intends to develop subsequent versions of MRS Online that facilitate online lodgement of virtually all usually required documents).

Poor quality reproductions of such reports are of no use to CASA and DAMEs will be required to send replacements if MRS is unable to capture a legible image. This problem particularly arises with photocopied documents that are transmitted by facsimile.

Once a medical assessment report is received, the MRS Expert System will automatically determine whether or not the applicant clearly meets the medical standard(s) for the class(es) of medical certificate(s) sought. If the required medical standard is met, an automatic e-mail advice will immediately be dispatched to the originating DAME.

On receipt of such e-mail advice, a DAME may revalidate an applicant’s existing medical certificate for the appropriate period specified in the Regulations. Refer **CASR 67**.

If, for any reason, a DAME is unable to dispatch a routine medical assessment report immediately following its completion, but considers that an applicant meets the required standard for medical certification, the DAME may then revalidate the applicant’s existing medical certificate for the appropriate period specified in the Regulations. Refer **CASR 67**.
A DAME usually must not revalidate any medical certificate unless:

- e-mail advice from CASA confirms that the applicant meets the required medical standard; or
- he/she is unable immediately to dispatch a routine medical assessment report to CASA, but considers that the applicant meets the required medical standard; and
- the existing medical certificate does not bear the condition ‘Renew by CASA only’.

However, where the holder of a class 1 medical certificate which has been issued for 12 months is an ATPL aged over 40 who requires a medical assessment every 6 months to meet ICAO’s requirements (Refer to Section 2.15), a DAME may revalidate the existing medical certificate in the usual way for 2 months from the date of the examination, even though this period falls within the medical certificate’s continued validity for exercise of privileges in Australian airspace.

In this circumstance, the DAME should endorse the applicant’s medical certificate as follows:

‘Re-examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (this will usually be the date 2 months after the assessment date)

signature, date, DAME stamp

When a medical assessment report indicates that an applicant fails to meet the required standard for medical certification in any particular, the case will then be reviewed by CASA’s clerical assessors and/or medical staff and further advice provided to the applicant, DAME or other examiner as appropriate.
1. Administrative Aspects

1.7 Aviation Reference Number (ARN)

1.7.1 Aviation Reference Number (ARN) Identification

An applicant's Aviation Reference Number (ARN) must accompany all medical reports, ophthalmologists' reports, audiology reports and other specialists' reports and all correspondence concerning applicants sent to Aviation Medicine Section. All applicants should obtain an ARN prior to making an appointment with a DAME, DAO or DAEE for Original assessment. An ARN is required so the DAME or other examiner can connect to CASA's Medical Records System (MRS) to enter the applicant's medical details.

1.7.2 Aviation Reference Number (ARN) Registration

Application for an ARN can be made in person or by post. Application forms are available from the CASA website – refer Form 1162. Alternatively, visit one of the CASA Area Offices to apply in person.
A selection of frequently asked questions and answers to them is given below.

Q. When an applicant has had a required test or consultation independently some time before an equivalent CASA-required examination etc, under what circumstances will CASA accept such an examination in lieu of its own requirement?

A. The results of such external examinations are usually accepted only:

- where the result/report is credible in all the circumstances;
- where all parameters which CASA requires to be addressed in the report have been so addressed; and
- where the reported findings are sufficiently recent to be likely still valid at the time of the applicant's assessment for medical certification.

**Note:** CASA will not usually accept ophthalmological or audiometry reports which have not been completed on its own (electronic) stationery, even when these tests were performed for another Regulator, because of slightly different requirements and potential difficulty with interpretation.

Q. When an applicant has had a required test or consultation independently some time before an equivalent CASA-required examination etc, and it appears otherwise acceptable per provisions of the preceding paragraph, for how long will CASA deem such an examination to remain valid in lieu of its own requirement?

A. The usual maximum validity periods for independent routine test reports which CASA will accept are:

<table>
<thead>
<tr>
<th>Test</th>
<th>Maximum Validity Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>audiogram</td>
<td>12 months</td>
</tr>
<tr>
<td>ECG</td>
<td>6 months (applicant &lt; 40 years)</td>
</tr>
<tr>
<td></td>
<td>3 months (applicant +/&gt; 40 years)</td>
</tr>
<tr>
<td>fasting blood lipids/glucose estimations</td>
<td>6 months</td>
</tr>
<tr>
<td>ophthalmology reports</td>
<td>6 months</td>
</tr>
</tbody>
</table>

If any results are abnormal or equivocal, repeat studies will be required.

Q. When an applicant has had a clinically-indicated test or consultation independently some time before an equivalent CASA-required examination etc, under what circumstances will CASA accept such an examination in lieu of its own requirement.

A. CASA will deal with each such case on its individual merits. DAMEs and other medical practitioners involved in an applicant's case management are encouraged to contact medical staff at CASA's Aviation Medicine Section to discuss individual requirements.
Q. What are CASA’s requirements for medical certification of NZ-qualified pilots who are granted equivalent Australian medical certificates under the terms of the Trans Tasman Mutual Recognition Act (TTMRA)?

A. The TTMRA and the reciprocal NZ legislation apply only to professional licence holders, so effectively concern only Class 1 licence holders. The legislation is completely silent on the issue of medical certification, so CASA and CAA NZ have agreed to deal identically, as follows, with affected pilots whose initial qualifications were gained in the other country but who now have a local licence.

The CAA NZ medical certificate used to validate the original (NZ) licence may be used to validate the newly issued Australian licence until expiry of the NZ medical certificate. (For a class 1 medical certificate, this may permit a validity period of up to 12 months). The relevant authority for this is CAR 5.04 (2).

The licence holder is required to carry the CAA NZ medical certificate when exercising the privileges of the newly issued Australian licence, and also to observe any conditions set out on that medical certificate or in an accompanying letter issued by CAA NZ.

On expiry of the CAA NZ medical certificate, the holder of the licence granted under TTMRA is required to undergo a full CASA ‘Original’ Class 1 medical assessment, including ophthalmology report, audiometry, fasting blood lipid and glucose estimations and resting ECG. As for other Class 1 applicants, a stress ECG should be arranged if indicated. Thereafter, these licence holders will be required to meet identical requirements to all other Class 1 medical certificate holders, including the usual suite of periodically required screening tests.

Q. For how long after blood donation should licence holders/applicants who donate blood refrain from exercising the privileges of an aviation licence?

A. CASA recommends that holders of all classes of medical certificates should usually refrain from exercising privileges of any aviation licence for at least 24 hours after a routine blood donation. In other or unusual circumstances, consultation with a DAME or contact with CASA Aviation Medicine Section is advisable before resuming exercise of privileges.
2.1 Ophthalmology

2.1.1 Overview

Visual cues provide the pilot's most important sensory input. Good visual acuity over all working distances is essential for safe operation of an aircraft. Information should be sought about the range of visual performance required of each pilot so that relevant advice may be given about suitable correction, if required, and about protection against glare.

If there is any doubt whether a pilot meets the required visual standard, referral to a CASA Designated Aviation Ophthalmologist (DAO) or Designated Aviation Eye Examiner (DAEE) for a detailed assessment and report is mandatory. A standard form has been developed for routine ophthalmological examination required for professional aircrew and ATCs (see also 6. Aviation Medicine Forms). Original examinations must be undertaken by a DAO or DAEE.

Visual Requirements Standard – CASR Part 67

The visual requirements standards are found in the following paragraphs of CASR Part 67:

**CASR 67.150**
For medical standard 1
Table 67.150
1.31 – 1.39

**CASR 67.155**
For medical standard 2
Table 67.155
2.31 – 2.39

**CASR 67.160**
For medical standard 3
Table 67.160
3.29 – 3.37
2.1.2 General Visual Requirements

The Medical Standards in the Civil Aviation Safety Regulations (CASRs) stipulate that the functions of the eyes and their adnexae shall be normal. This requirement encompasses more than simply visual acuity. All Designated Aviation Medical Examiners (DAMEs) and Designated Aviation Ophthalmologists (DAOs) and Designated Aviation Eye Examiners (DAEEs) must satisfy themselves that this criterion has been fulfilled before assessing a pilot as meeting the required visual standard.

All applicants for initial issue of a Class 1 and/or 3 Certificate must be seen by a DAO or DAEE. All applicants for issue of a Class 1 and/or 3 Certificate must be seen by a DAO or DAEE at the time of first renewal of medical certificate after reaching the age of 60 years and at two-yearly intervals thereafter.

2.1.3 Refractive Error

Some degree of refractive error is found in the majority of eyes. Most of these errors are simple and are due to a slight lack of coordination of development of the various parts of the refractive system. They represent, therefore, a biological variation from the norm and should not be regarded as pathological.

Pathological refractive errors are relatively uncommon. They are due to gross developmental abnormality. The degree of error is usually high and the visual acuity is often not fully correctable while, particularly in myopia, the eye may show degenerative changes.

At birth, the majority of eyes are hypermetropic. From then until the age of eight years, this hypermetropia is seen to increase. After age eight, refraction becomes less hypermetropic (or more myopic) until approximately the age of 25 to 30 years, when relative stability is reached.
If, therefore, a young applicant has had less than the average degree of hypermetropia at birth, the natural shift to the more myopic side can result in the development of overt myopia, a development that is likely to progress until the age of 25 to 30 years, when some degree of stability is reached.

It is difficult to give an accurate prognosis of the progress of refractive errors since individuals do not necessarily conform to the population norm, and those who develop frank myopia frequently progress to the myopic side more rapidly than those who remain on the hypermetropic side of the population norm.

CASA has not placed restrictions on applicants who require high levels of correction in order to meet the required visual standards. CASA considers that ability to meet the standard is all that is required, regardless of the power of corrective lenses necessary to achieve this outcome.
2.1.4 Refractive Surgery

**Radial Keratotomy (RK)**

The role of radial keratotomy in reducing refractive errors is a significant current issue in aviation medicine. Persons who have undergone this procedure are often subject to diurnal fluctuation in visual acuity. If this is significant, (i.e. loss of more than one Snellen line for professional licence applicants and more than two Snellen lines for private licence applicants) *even if an applicant’s visual acuity is still within the pass standard*, this fluctuation constitutes failure to meet the visual requirements of the standard(s) concerned.

Applicants who undergo radial keratotomy before their myopia has stabilised are at risk of continuing progression of their myopia.

The long-term consequences of radial keratotomy are not yet well documented, so it is impossible to predict any long-term implications for pilot licensing. Applicants should be reminded of this uncertainty as it may affect their chances of employment in the aviation industry.

Following radial keratotomy, the refraction takes some time to stabilise to its new value. Flying is not permitted while the refraction is still plastic. Evidence of stability requires:

- A variation not exceeding 0.25 dioptres in refraction
- A visual acuity changing by not more than one Snellen line
- Visual acuity, which at least satisfies the minimum standard for the class of licence, at three paired serial measurements.

These three paired serial measurements are to be part of a full ophthalmological examination, are to include measurements early in the morning and late in the day, and must be delayed for at least three months following surgery. Note that some eyes may not have stabilised even as late as a year after surgery.

A second problem associated with radial keratotomy is sensitivity to glare. This can cause considerable difficulty in the healing phase but tends to settle with time. Testing of visual performance with a bright light shining at the applicant should demonstrate any continuing glare sensitivity.

All applicants whose eyes have stabilised following radial keratotomy must thereafter have an ophthalmological assessment every two years for Class 1 and 3 and every five years for Class 2 Medical Certificates.
2.1 Ophthalmology

Photo-ablative Refractive Keratectomy (PRK)

This is a new technique, using a laser, for changing refraction. The long-term implications are as yet unknown. The requirements for assessing stability after radial keratectomy outlined above should be followed after photo-ablative refractive keratectomy.

2.1.5 Monocular Pilots

Monocular pilots may be divided into two categories:

- The monocular condition—the situation in which an applicant has only one functioning eye.
- The functionally monocular condition—the situation in which an applicant has two eyes, but the visual acuity of one cannot be corrected to 6/9 or better.

Provided the visual acuity requirements can be met in the functioning eye, with or without correction, a waiver is granted for Class 2 certification, limited to Australian Airspace, for both the monocular condition and for functionally monocular pilots. Likely Conditions on an applicant’s Medical Certificate are:

- Not valid for mustering or agricultural flying.
- Valid in Australian airspace only.
- Special conditions apply.

Functionally monocular pilots who can meet the visual acuity standard with the remaining eye may obtain Class 1 certification. These applicants are required to show that flight safety is not jeopardised by the reduced visual acuity or absence of the other eye. Only the Aviation Medicine Section can issue this waiver. Likely Conditions on the resulting Medical Certificates are as set out above for Class 2 Medical Certificates.
2.1.6 Visual Acuity

**Distant Vision**

Record the uncorrected distant visual acuity in each eye separately, also binocular acuity. If the applicant wears correcting lenses, record the corrected acuity also for each eye and binocularly. For original examinations, check visual acuity without contact lenses and then with contact lenses. Acceptable values are as follows.

**Student and Private Pilots**

For students and private pilots, acceptable values are at least 6/12, corrected if necessary, in each eye. An acuity of at least 6/9 (with or without correction) with both eyes open is also required.

If the student or private pilot applicant cannot achieve 6/12 (with or without correction) in each eye, the DAME should inquire about the defective eye and record the cause.

In cases of doubt, referral to a CASA Designated Aviation Ophthalmologist or prescribing optician is indicated. These applicants may be acceptable for non-commercial licences; however, their licences will carry endorsements restricting operations to Australia.

By definition, if an applicant achieves no better than 6/12 in the poorer eye, the applicant is considered to be functionally monocular.

Applicants assessed as suitable for licensing with appropriate endorsements are required to have a stable visual condition to which they have adjusted. This provision affects pilots who have poor foveal static visual acuity but whose peripheral vision is normal (in practice, amblyopia). Those who have completely lost an eye or its vision may be assessed as fit after the Aviation Medicine Section’s consideration of such factors as the extent of visual field loss and the duration of the condition.

**Professional Flight Crew and ATCs**

For all professional flight crew and ATCs: 6/9, corrected if necessary, in each eye separately. Additionally, the acuity must be 6/6 or better when tested with both eyes open.

Applicants with high refractive corrections (i.e. greater than +/-5 dioptres) should be advised of the possible complications, which may affect their vision, and of the implications for their aviation careers, particularly their increased statistical chance of retinal detachment.

**Note** The equivalent spherical error is taken as the sum of sphere power plus half that of the cylinder, the calculation taking account of arithmetical signs.
The High Myope

CASA prescribes no limit and high myopes who meet the standard after correction are assessed as meeting the standard. The final decision in cases of high myopia depends on the applicant’s functional visual ability and on the absence of significant ocular pathology.

Although high-density lens material has enabled the lenses in corrective spectacles for applicants with high myopia to be thinner and so not cause unacceptable peripheral distortion, contact lenses are the preferred method of visual correction for myopes who require more than 5 dioptres of correction.

Near Vision

Near vision at all ages must meet the standards specified in the CAR Schedule (N5 with or without correction at 30-50cm and N14 at one metre without correction). DAMEs must check this function at every periodic medical examination for all applicants for aviation licensing.

Professional flight crew should be advised to have periodic ophthalmological examinations from age 45 to detect early signs of developing ocular pathology.

If an applicant cannot meet the standard, he or she should be referred for an ophthalmological assessment and appropriate spectacles prescription.

Near-vision spectacles have a limited range of clear vision, which depends on the power of the lenses prescribed and on the residual accommodation of the wearer.

It is vitally important that the range of clear vision encompasses all the near objects that need to be seen clearly. Typically this ranges from the reading of maps and operating manuals at ordinary reading distance to reading the more distant parts of the instrument display at a distance of one metre or more.

It is important that the spectacles prescribed are suited to the near working distances imposed on the pilot by the configuration of the flight deck of the aircraft. This becomes increasingly critical as an applicant’s presbyopia progresses with age.

The pilot should measure the working distances encountered in all seating positions on the flight deck, and record them prior to having a prescription for near vision determined. A suggested checklist for pilots is as follows.
2.1.7 Working Distances Checklist

<table>
<thead>
<tr>
<th>Object</th>
<th>Nearest (cm)</th>
<th>Farthest (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flight instruments</td>
<td></td>
<td></td>
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<tr>
<td>Engine instruments</td>
<td></td>
<td></td>
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<tr>
<td>Checklists</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic Flight Instrument Systems (EFIS) and flight management display</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach charts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General charts and manuals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Overhead Panels**

Overhead panels can cause difficulty because of their close proximity to the pilot’s eyes. This proximity ensures that the presbyopic pilot has difficulty seeing legends and numerals clearly, yet in order to view through the near segment of bifocals or through look-overs it is necessary to tilt the head back awkwardly. This may present particular difficulty in some aircraft types.

Possible solutions to difficulty in viewing overhead panels:

- The simplest solution is to lift the bifocals (or look-overs) so that the head does not have to be tilted so far back.

- Flip-down spectacles can be provided with an additional lens power to focus the overhead panel clearly when viewing through the upper distance part of the bifocal lens.

  However, flip-downs are cumbersome and there is a risk that they may be left down, causing blurring of distance vision. There is also a risk that they may flip down inadvertently as a result of turbulence during some critical phase of flight.

- There are vocational multifocals available which have a near segment in the upper part of the lenses as well as in the lower part. However, the distance portion between the two segments is only 12 or 15mm deep giving a distant vertical field of view of only 21 to 26 degrees. Pilots may find this impedes their visual scanning.

- A special multifocal lens can be constructed to provide a small near viewing segment in one corner of the upper part of the lens.
The more complex solution should usually only be pursued if pilots experience significant and persistent problems with the overhead panel. The overhead panel usually does not demand perfect visual acuity and is not often used in critical phases of flight, so it should not be assumed that it presents serious operational difficulties.
2.1.8 Bifocal Segment Height

The height can be set so that the pilot views the instrument panel through the near segment as well as using it for charts and manuals at an ordinary reading distance.

Alternatively the segment can be set low so that it is used only for charts, manuals and reading. When viewing the instrument panel the pilot will look over the top of the near segment to use the distance part of the bifocal.

This choice will depend on:

- Whether or not the pilot is having any difficulty reading instruments on the forward instrument panel; and
- The pilot’s residual accommodation. (At least 2.75 to 3.50D of accommodation is required to see the instrument panel clearly and comfortably through the distance part of the bifocals.)

If the segment is set low, the bifocals may not be suitable for everyday reading outside the aircraft. A separate pair of reading glasses of bifocals for everyday use may then be required.

How to Determine the Correct Segment Height

Optometrists and spectacle dispensers are skilled at setting the segment height correctly, but flying is a demanding occupation and it is worth taking pains to obtain an accurate prescription for the height of the near segment.

It is worth checking segment height on chosen frames or single lens distant vision glasses by stretching adhesive tape across the frame or lens whilst the pilot is seated in the cockpit. The position of the tape can be varied until its upper edge is at the height desired for the top of the near vision segment.
2.1.9 The Need for Trifocals

As presbyopia advances, the power of the near spectacle correction must be increased to compensate for further loss of accommodation power. As a result, the range of clear vision decreases.

For a pilot aged about 45 with 3.50D of residual accommodation, the power of the near addition typically prescribed is 1.00D. For this person, the range of clear vision is from two metres to 220mm, which should be more than adequate for all flight deck near-vision tasks. However, a pilot aged 50 to 55 with only 1.50D of residual accommodation is typically prescribed a near addition of 1.75D, giving a very much smaller range of clear vision from 800mm to 360mm. This range is suitable for near tasks at ordinary reading distances but does not permit clear vision of those parts of the instrument panel beyond 800mm.

When this occurs, trifocals are required. Trifocals provide an intermediate segment that has approximately half the power of the lower near segment.

2.1.10 Acceptable Forms of Correction

To comply with operational requirements, reading correction must be in the form of ‘look-overs’, bifocal or trifocal lenses as appropriate. Single vision lenses for near correction are not acceptable. See the diagram below.
2.1.11 Progressive Power Lenses

These lenses provide a variable focus depending on which part of the lens is used for viewing. They provide a narrow intermediate visual channel and larger distant and near areas. These lenses may be associated with illusions of movement and distortion in the peripheral field of view. They should only be used for flying after adaptation in flight as a non-critical crewmember.

2.1.12 Contact Lenses

Provided the following criteria are met, contact lenses may be worn for correction of distance vision.

Both hard and soft contact acuity lenses are acceptable. The pilot must be able to wear the lenses throughout an ordinary day without experiencing any discomfort or deterioration of vision.

An acuity of 6/9 in each eye is required with correcting spectacles immediately after removal or displacement of contact lenses.

The pilot and the prescriber are responsible for ensuring that the pilot has adapted to the contact lenses sufficiently to perform his or her aviation duties. The duty period depends on the type of operations in which the pilot is engaged. The length of time that contact lenses can be worn without producing discomfort differs for private/pleasure flying and long haul commercial operations.

The choice of lens depends upon the nature of the correction required and on cabin conditions encountered.

Hard lenses tend to induce more discomfort and can be displaced by propeller wash or strong wind. Should a pilot need to remove the lenses in flight and substitute spectacles, post-wearing blur with decreased visual acuity should be anticipated.

Soft lenses do not cause those problems to the same extent. However, they may not fully correct astigmatism of greater than one dioptre.

For high myopes, soft contact lenses are preferable to spectacles. In the greatest degrees of myopia, the required visual acuity standards may not be able to be met using spectacles.

For initial issue examination, the contact lenses should be removed and the applicant’s visual acuity checked while wearing spectacles. The uncorrected vision should also be recorded. At renewal medical examinations it is not necessary for the applicant to remove the contact lenses unless the examiner considers this clinically indicated.
2.1.13 Sunglasses

Glare is often a cause of significant discomfort when flying above cloud or when flying into the sun. Sunglasses may be required in such circumstances.

There are two basic factors to consider when selecting sunglasses, namely the frame and the lenses.

Any spectacle frame reduces the field of vision. Narrow frames that carry large lenses are desirable. The most critical problem with frames arises from the presence of wide side-arms which significantly impair the peripheral visual field.

Sunglass lenses should protect the eyes from glare while not adversely affecting the visual cues necessary for safe flight. Accordingly, lenses should not be too dark, and should transmit at least 15% of incident light. The tint used should be "neutral density" (N.D.), that is, a greyish tint that does not distort colour perception or adversely affect red signal detection and recognition. The recommended tint is N.D.15.

Lenses of polycarbonate are preferred because of their impact-resistance and ability to absorb ultra-violet and infrared rays. However, these lenses can scratch readily and any scratched spectacles should be discarded.

To ensure that sunglasses provide adequate protection from solar radiation that may damage the eyes, only those sunglasses that conform to the current Australian Standard should be worn.

Sunglasses that conform to the current Australian Standard also meet acceptable standards for lens quality, frame strength and lens retention.

For aviation use, those sunglasses marked "Specific Purpose Sunglasses" are recommended, provided their frames are appropriate. The lenses of these sunglasses have been specifically designed for use in conditions of intense glare, such as in flight above cloud. At high altitude, atmospheric absorption of ultra-violet radiation is reduced.

Polarising sunglasses should **not** be used when flying. The polarising filter interacts with the cockpit transparency to produce a distorted and degraded visual field that poses a threat to air safety.

The pilot who already wears prescription spectacles for flying can choose from a number of options for glare protection. Prescription sunglasses with N.D.15 lenses can be obtained, or N.D.15 clip-on or flip-up sunglasses may be worn over prescription spectacles.

Pilots who require correction of their near vision only and who wear "look-overs" are advised to obtain bifocals and a plano upper segment. Clip-on or flip-up sunglasses can then be worn. However, the dangers of flip-ups previously mentioned should be recalled.
Graduated lens tint is another option. This provides glare protection for distant vision outside the aircraft, while near vision inside the aircraft is not impeded by the tint. It is usually considered that the use of a single tinted segment in bifocal glasses should be avoided as the visual effect of a "false horizon" may be disturbing and dangerous.

### 2.1.14 Photochromics

Spectacles can also be prescribed with photochromic lenses — lenses that change their density depending on the ambient light level. Under bright conditions they are like sunglasses, while in darker conditions they transmit light almost as well as untinted lenses. However, photochromic lenses have disadvantages that render them unsuitable for use by pilots.

Firstly, their transition times are relatively slow. Photochromic lenses take about five minutes to increase their density to the level of sunglasses, but more importantly, the bleaching time from maximum to minimum density can be as long as 30 minutes or more, although there is a rapid lightening of the lens in the first five minutes. This may be too long when there is a sudden variation in light during a descent into or under cloud, or because of a rapid change in cloud cover.

Their second disadvantage is that, even when fully bleached, photochromic lenses still absorb slightly more light than untinted lenses. Since vision is critically dependent on ambient light levels at night or otherwise when light levels are low, even this small decrease of light reaching the eye through photochromic lenses is undesirable. The inherent degradation of these lenses with time effectively prohibits their use in flying or controlling air traffic and applicants should not use them in these circumstances.
2.1.15 Colour Vision

Normal colour perception is becoming increasingly important as colour-coded cathode ray tube displays and colour coded visual approach lights become more prevalent. If any element of doubt exists about a pilot's ability to perceive colour normally, the case should be referred to the Aviation Medicine Section.

**Commoner Types of Colour Vision Defects**

<table>
<thead>
<tr>
<th>Type (Incidence)</th>
<th>Essential Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protanomaly (1.0%)</td>
<td>Colour matches are different from those made by normals (anomalous colour matching). Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Extreme protanomaly (0.2%)</td>
<td>Reduced colour discrimination for red, yellow and green. Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Protanopia (1.0%)</td>
<td>Confusion of red, yellow and green. Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Deuteranomaly (4.5%)</td>
<td>Colour matches different from those made by normals.</td>
</tr>
<tr>
<td>Extreme deuteranomaly (0.5%)</td>
<td>Reduced colour discrimination for red, yellow and green.</td>
</tr>
<tr>
<td>Deuteranopia (1.5%)</td>
<td>Confusion of red, yellow and green.</td>
</tr>
</tbody>
</table>

**Test Procedure**

The DAME is required to conduct a colour perception test, using the Ishihara 24-plate test. This test should be conducted even if the applicant is to be referred to an ophthalmologist. If the applicant should incorrectly identify more than two of the Ishihara plates, a test on a Farnsworth lantern is needed to determine whether or not he or she meets the colour perception standard.

The Ishihara plates test should detect all red/green colour vision defectives. Examiners should be aware, however, that some applicants may have learned the plates, and their presentation in random order is important. Other applicants have been trained to identify numbers on the plates by means of brightness cues or may even attempt to pass the plate tests by wearing an X-chrom or similar lens—a red contact lens worn in one eye which improves the colour defective's performance on the test.
Plate Testing

Reliable colour vision testing using the pseudoisochromatic plates requires that a standardised procedure be followed carefully. The main points are:

Illumination

Only the following are permitted:

- Daylight (but not direct sunlight). This is preferred.
- Fluorescent light from a fluorescent tube of 6,500 degree K colour temperature (normal daylight tubes).
- Phillips 'Bleu' incandescent lamp.
- Macbeth Colour Source C.
- Where an applicant is unable to pass the test when it is performed under artificial lighting conditions, it should be repeated in daylight before a failure is recorded. However, this additional test is not required where an applicant makes more than 12 errors or gives a history of known defective colour vision.

Position

The applicant may stand or be seated, but should look squarely at the test plates from about 75cm distance. The applicant’s position should be adjusted so that no specular reflection from the glossy surface of the plates is observed. The applicant should not move his or her head while taking the test.

Exposure Time

Each plate is exposed for a maximum of five seconds.

Procedure In Detail

1. Check the applicant's position, illumination, watch or clock with second hand.
2. Open the book at the first (demonstration) plate.
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3. Read out at conversational speed, pausing perceptibly where indicated.

“I am going to show you some pages of dots. On some of them you can see a number, but some have no number. I want you to tell me if you can see a number and what it is. (Pause.)

If you can't see a number, say "no number". You have up to five seconds for each page. (Pause)

Is that clear?"

4. Now expose each test plate in random sequence.

5. When the applicant responds, or after five seconds have elapsed, whichever is sooner, turn to the next plate. Most applicants respond almost at once.

6. If more than one response is given to a plate, eg, "It's either three or eight", say "which one are you going to choose?" If the applicant changes his or her response, record the second response.

Marking Standard

Applicants scoring two errors or less on the 24-plate edition of the Ishihara plates meet the required standard. Those making three or more errors need to be tested on the Farnsworth Lantern.

**Note:** If the DAME suspects that a filter aid is being used, each of the applicant’s eyes is to be tested separately and then binocularly. The results are to be notified to the Aviation Medicine Section.

Further Testing

Some applicants with defective colour vision may be safe for aviation duties, e.g. mild deuteranomals. The Farnsworth Lantern passes these while failing all protanopes and deuteranopes and most protanomals and the more severe deuteranomals.

The Australian locations of Farnsworth Lanterns are listed in 5. Colour Vision Testing. Farnsworth Lanterns are not transported to outlying areas. Examiners should refer applicants who fail the plate test directly to the nominated centres for Lantern testing. Such referrals should be noted on the examination form. If there is no record of such referral on the form, the Aviation Medicine Section notifies applicants of their right to undergo further testing.

**Note:** Applicants for original class 3 medical certification must pass the Ishihara Plate Test.
An applicant who fails to meet the colour perception standard (i.e. who fails both the Ishihara Plate Test and the Farnsworth Lantern, but who meets all other standards) is eligible for issue of an operationally restricted student pilot, private pilot or commercial pilot licence. The holder of such a licence is given a dispensation to operate at night in a suitably radio-equipped aircraft. This dispensation applies to Australian airspace only.

Class 1 and class 2 applicants who are unable to pass either the Ishihara Plate Test or Farnsworth Lantern Test may be further assessed by means of Practical Signal Light Test. Details are available from Aviation Medicine Section.

2.1.16 Cataract

Applicants who have undergone cataract extraction(s) and who achieve acceptable visual acuity with lens implant and/or contact lenses may be passed at all licence levels following individual assessment by the Aviation Medicine Section. Full reports are required.

All other cases of cataract should be referred to an ophthalmologist. A report including assessment and prognosis is required. The final decision in these cases is based on the ophthalmology report.
2.1.17 Demyelinating Disease

Multiple Sclerosis (MS) is a central demyelinating disease involving multifocal demyelination of white matter, which initially affects young people under 40 years of age. The diagnosis requires multiple attacks of demyelination separated in time and locations. A thorough neurological history is important at the time of presentation. Nuclear magnetic resonance imaging (MRI) offers some help in diagnosis but should not be substituted for good history taking.

The most common ocular manifestation of MS is optic neuritis. It is the presenting feature in 25% of cases and occurs during the course of established disease in 70%. Between 50% and 70% of patients in the 20 - 40 year age group presenting with optic neuritis subsequently develop systemic demyelination.

Optic neuritis typically presents as sudden unilateral blurred vision progressing over a few days. The vision is often described as being "washed out"; colours appear desaturated and there is often associated retro/peri-ocular pain aggravated by eye movements.

Signs include reduced acuity of variable severity from minimal to "no perception of light"; an afferent pupillary defect (pupil dilates during the "swinging light" test); and dyschromatopsia (poor colour discrimination performance).

The most common visual field defect is a central scotoma. Ophthalmoscopy may reveal a swollen optic disc although the disc is often normal in the retrobulbar type of MS. Optic atrophy (associated with previous attacks) may be found in the ipsi- or contra-lateral eye.

Visual recovery is slower than the initial loss and usually takes between four to six weeks. About 90% of sufferers recover normal visual acuity. Minor defects in colour vision and brightness appreciation may persist. The effects of subsequent attacks are additive. There is no correlation between the degree of visual defect during the attack and the final visual outcome.

All pilots with optic neuritis should be referred to a Designated Aviation Ophthalmologist. Examinations should include visual field plots of both eyes. A typical case may require CT and MRI scanning to rule out compression of optic nerves or chiasma.

Sinister features in applicants with MS include failure of visual recovery after four weeks, persistent periorcular pain, proptosis, development of a quadrantic or hemianopic visual field defect, and field defect in the contralateral eye. All cases with severe visual acuity loss (<6/60) should be further investigated.

Flying duties in between infrequent attacks are possible provided there is adequate neurological and visual function monitoring. All cases should be referred to the Aviation Medicine Section for final assessment after adequate work up.
2.1.18 Glaucoma

All applicants for flight crew licensing who have glaucoma, or whom the DAME suspects may have glaucoma, must be assessed by a Designated Aviation Ophthalmologist. The DAME should not revalidate their Medical Certificates.

Primary Glaucoma

Closed Angle Glaucoma

Applicants should not be passed until the condition has been surgically corrected. Once corrected, a pass assessment may be issued after ophthalmological review.

Open Angle Glaucoma

Most open angle glaucoma is controlled by medication. The Aviation Medicine Section may issue a pass assessment only after receipt of a satisfactory ophthalmologist's report, which must include results of perimetry.

Preferred treatment is with beta-blocker drops. However, applicants with glaucoma controlled by other means are assessed individually.

Open angle glaucoma that has been successfully treated by microsurgical or laser techniques may be assessed as meeting the required standard by the Aviation Medicine Section.

Open angle glaucoma controlled with drugs requires annual ophthalmological review, including perimetry.

Secondary Glaucoma

Medical assessment depends on the underlying disease and the effectiveness of control. All cases should be referred to a Designated Aviation Ophthalmologist.
2.1.19 Macular Disease

The symptoms of macular disease include blurring and distortion of vision with micropsia or macropsia, which can be assessed with an Amsler grid. (This consists of a piece of paper showing a 10cm square divided into 5mm squares with a central fixation dot).

The subject is asked to fixate on the central dot, with each eye separately, at one third of a metre and to mark on the chart with a pencil, scotomata or areas of distortion.

When abnormalities are present, immediate referral to a Designated Aviation Ophthalmologist is required.

The commonest conditions affecting the macula are Central Serous Retinopathy and Disciform Macular Degeneration. All cases require final assessment by the Aviation Medicine Section.

Central Serous Retinopathy

The condition affects healthy young men with a hectic lifestyle. Only one eye is usually affected and reduction of acuity is mild (6/12 or 6/18). With a direct ophthalmoscope, dulling of the macular reflex is seen, representing a shallow central retinal detachment.

Vision recovers spontaneously within six weeks in 90% of cases. Stereoaucity is temporarily lost and pilots should not fly until full recovery occurs. Laser treatment has been shown to speed the resolution of symptoms, but does not improve the final visual outcome, and no treatment is usually advised. The condition recurs in 20 to 30% of cases and the second eye is affected in 20%.

Macular Degeneration

This condition typically affects the elderly but inherited forms may affect younger people. Ophthalmoscopy may show small grey, yellow or white lesions, like small crystals, at the macula. These are called "drusen" (German, druse = nodule).

The visual acuity is usually well preserved, 6/9 or 6/12, until a further complication occurs — the development of a subretinal neovascular membrane that spreads under the macula and reduces vision to 6/60 or less.

To prevent the visual acuity from deteriorating below standard, regular follow-up is essential. In the early stages when the vision is distorted, but the acuity well preserved, the subretinal membrane can be obliterated by argon laser treatment.
2.1.20 Retinal Detachment

This may occur at any age although it is commoner in the elderly. Myopic people, particularly high myopes, are at increased risk. Advice on the long-term prospect of an aviation career should be given to those with high myopic refractive errors.

The most frequent type of retinal detachment follows collapse of the vitreous gel — Posterior Vitreous Detachment. The symptoms are a sudden shower of floaters (caused by vitreous haemorrhage or pigment release) and flashing lights, due to vitreous traction on the retina. Urgent referral to an ophthalmologist is mandatory to exclude the presence of a retinal tear.

At the stage when the retina is torn, but not yet detached, laser treatment may be used to seal the retinal tear before fluid from the vitreous cavity passes through it to detach the retina. Once the retina begins to detach, prompt surgery is necessary. If surgery can be undertaken before the retina detaches from the macula, the prognosis for maintained vision is excellent. Once the macula has been detached for more than a few hours, visual recovery is only partial.

A special form of retinal detachment, retinal dialysis, is the commonest type of detachment seen in young, otherwise healthy people who are not myopic. It may occur after a blunt injury, which causes a tear in the extreme periphery of the retina.

Intraocular gases are often injected into the vitreous cavity during retinal detachment surgery. The most commonly used gases are air, sulphur hexafluoride (SF6) and perfluoropropane (C3F8). Air takes only three or four days to be resorbed whereas the longest acting gas, C3F8, persists for up to six weeks. Air travel should be avoided until the gas bubble resorbs. Bearing in mind even in pressurised aircraft cabin altitude can be up to 8,000ft; a dangerous rise in intraocular pressure can occur if this precaution is overlooked.

In all cases of retinal detachment, once the condition is stabilised, a computerised visual field plot is mandatory before considering the applicant for return to pilot duties. The pilot should retain a copy of the plot for future comparison. The Aviation Medicine Section assesses each case individually.

2.1.21 Retinal Injuries

If a severe injury to the eye has occurred, with definite or suspected perforation of the globe, any aerial transport should be conducted at a cabin altitude of 4,000ft or less.
2.1.22 Strabismus

Whereas some degree of heterophoria is the norm, heterotropia (i.e. a manifest deviation of one eye from its normal position which occurs despite both eyes being open and uncovered), requires assessment by a Designated Aviation Ophthalmologist and final assessment, on an individual basis, by the Aviation Medicine Section. An applicant with an acuity (corrected or uncorrected) of worse than 6/12 is unacceptable, and a binocular acuity of worse than 6/9 is also unacceptable.

A majority of squint sufferers who have excellent cosmetic results from surgery and good visual acuity in each eye may still lack normal stereopsis (depth perception). They develop distance judgement by monocular cues and these are usually superior to those available to applicants who have lost an eye. However, their fine distance judgement for near distances is inferior to those with normal binocular vision. The Aviation Medicine Section individually assesses persons lacking binocular vision.

Squint may be latent or manifest. A latent squint is likely to become manifest under the influence of such factors as illness, fatigue, stress, drugs or alcohol. A cover test alternately on each eye unmasks latent squint.

The tests described below are designed to detect those who lack binocular vision.

Cover Test

Test at near (30cm) and at six metres. Use an accommodation fixation target at both distances. (For near an N5-size print and for distance a 6/12 letter). Ask subject to look at the fixation target, cover one eye and observe the other eye for refixation movement. Repeat test procedure for the other eye. Any refixation movement indicates possible squint.

Lang Stereo Test

Test at near (30cm). Hold card still and ask subject to name any pictures seen. Pass is three pictures: cat, star and car. A new Lang stereo test that tests to 200 degrees of arc is available. This may be considered superior to the standard Lang test that tests to 55 degrees of arc.

Worth Four Dot Test

Subject wears red/green goggles. Pass is identifying four lights, one red, two green and one white. Test at six metres only. Those who fail can undergo further tests, for example six-metre vectograph or Bagolini lens test to confirm if they truly lack binocular vision.
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### 2.2.1 Introduction

This section details the requirements for cardiological assessment of an aircrew member or air traffic controller and provides guidance on the aeromedical disposition of pilots and cardiovascular disease.

The aim of the examination is to ensure that the applicant does not suffer from any cardiovascular condition which carries an increased risk of incapacitation or which produces a decrement of physiological functional reserve that may jeopardise operational safety.

The DAME should recognise that an individual with an unrestricted Medical Certificate must be capable of performing all of the activities that are possible under the licence held.

These activities could include:
- Aerobatics, with the possibility of high G forces being encountered
- Operations in extremes of temperature for long periods, and
- Operations at altitudes where the partial pressure of atmospheric oxygen is decreased to two-thirds that which exists at sea level.

### 2.2.2 The Cardiovascular Standard – CASR Part 67

<table>
<thead>
<tr>
<th>CASR 67</th>
<th>The cardiovascular standards are found in the following paragraphs of CASR Part 67:</th>
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<td>CASR 67.160</td>
<td>For medical standard 3 CASR 67.160(7) Table 67.160 3.9 – 3.11</td>
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2.2.3 Assessment

The DAME should note relevant risk factors for ischaemic heart disease in assessing an individual's cardiovascular system. The risk factors to be considered are:

- Age
- Total cholesterol (fasting estimation)
- The total cholesterol to HDL cholesterol ratio (fasting estimation)
- Blood glucose (fasting estimation)
- Cigarette smoking
- Systolic blood pressure
- Hypertension
- Diabetes Mellitus
- Obesity
- Lack of regular exercise
- Positive family history of cardiovascular disease.

An applicant with multiple coronary artery disease risk factors should be considered for more detailed examination such as stress ECG.

The requirements for mandatory 12 lead resting ECGs are detailed in section 1.4.1 Electrocardiographs in 1. Administrative Aspects.
2.2.4 General Principles

The following conditions are statistically associated with reduced functional capacity in cardiac reserve or with unpredictable risk of sudden incapacitation. Applicants with such conditions should therefore be assessed as medically unfit for certification. In individual cases, after thorough assessment, some may be granted Medical Certification.

- Uncontrolled systemic or pulmonary hypertension
- Any structural and/or physiological defect of the heart or circulation which results in regional circulatory ischaemia of a critical circulatory bed, or in ventricular hypertrophy or ventricular dilatation
- Any structural or physiological defect of the heart which results in electrical instability, either dysrhythmia or conduction defects
- A diagnosis of hemodynamically significant aortic stenosis
- Any structural or physiological defect of the heart or lungs which results in veno-arterial shunting and desaturation of arterial blood
- Any structural or physiological defect (and/or its consequences) which requires the use of cardiotonic or vasoactive agents for compensation of cardiac reserve and for control.
2.2.5 Hypertension

Uncontrolled hypertension is disqualifying. A systolic pressure of 150 mm Hg and/or diastolic pressure of 90 mm Hg are the upper limits acceptable, but the applicant's age and sex should also be considered. If either or both the systolic or diastolic pressure repeatedly exceed(s) these limits, the applicant's blood pressure is not acceptable, even if on treatment. (These values accord with recommendations of the National Heart Foundation of Australia). Investigations by 24 hour ambulant blood pressure monitoring may assist diagnosis of borderline cases.

Controlled (adequately treated) hypertension is allowable at all levels of licence provided that there is:

- No significant end organ damage
- Satisfactory ECG
- No adverse drug side effects.

Acceptable Medication

Most modern antihypertensive agents are acceptable for control of hypertension in aircrew, provided the applicant is established on the medication and has exhibited no adverse side effects from the drug(s).

The applicant must not pilot any aircraft or actively control air traffic following the commencement of antihypertensive therapy or of a changed treatment regimen until such time as there are no significant side effects from medication and, in any event, not within one week of the commencement of therapy or change in medication. Preferred drugs include diuretics, ACE inhibitors, calcium channel blockers, prazosin angiotensin II antagonists and beta-blockers. Particular care should be taken with use of antihypertensive medications by aerobatic pilots, because of the reduction in G-tolerance produced by these agents.
Designated Aviation Medical Examiner’s Handbook

2. Medical Aspects

2.2 Cardiology

2.2.6 Ischaemic Heart Disease

Technical Specifications of Investigative Procedures Required in these Protocols

Stress Electrocardiogram

1. Bruce protocol with a 12 lead ECG, with monitoring for at least six (6) minutes after cessation of exercise.

2. Applicant to reach at least 85% of predicted heart rate and at least nine minutes on the Bruce protocol or equivalent on the bicycle ergometer (maximum predicted heart rate = 220 beats per minute minus applicant’s age in years for men, 200 beats per minute minus applicant’s age in years for women).

3. Treadmill exercise is preferred but bicycle exercise is acceptable if the applicant is unable to perform on the treadmill.

4. Applicant should have been continuously in the time zone where testing is performed for at least 72 hours prior to the test.

5. Applicants should normally cease taking any beta-blocker 48 hours prior to the stress test, unless the medication is used to treat known ischaemic heart disease or a significant arrhythmia.

   When a beta-blocker is not so ceased prior to stress testing an applicant, an explanation of the reason is required from the treating or investigating cardiologist who supervises the stress test.

6. All reports of stress tests should include the following details:
   - duration of exercise (with comment if less than nine minutes);
   - level of perceived exhaustion of the applicant; and
   - any symptoms experienced by the applicant.

7. A positive stress electrocardiogram is defined by 1.0 mm or more of horizontal or down sloping ST segment depression at 0.08 sec after the J point.

8. A positive stress ECG is of adequate diagnostic validity if recorded when an applicant’s exercise capacity, heart rate and blood pressure responses reach at least 85% of predicted for age, sex, height and weight, and where the ST segment shift is consistent with ischaemia.

Note: A rise of more than 20 mm in systolic blood pressure response is expected. If the applicant returns a positive stress ECG with ST changes before reaching 85% of designated criteria, it is a matter of even greater aeromedical concern. Exercise electrocardiograms are a screening test for the presence of Ischaemic Heart Disease (IHD) but do not provide conclusive evidence of the presence of IHD. Applicants need not refrain from exercising privileges simply because they are required to undertake a stress ECG.
9. If an applicant is unable to reach nine minutes or equivalent on stress ECG then a gated heart pool scan and cardiologist’s opinion may be acceptable alternatives. In these circumstances, the reason for ceasing the test must be stated.

10. In appropriate circumstances (eg severe arthritis), pharmacological stress testing may be substituted. This should be discussed with CASA Aviation Medicine Section before it is undertaken.

11. The physician supervising the investigation should report exercise ECGs. Computer reporting of exercise ECGs is not acceptable to CASA.

**Stress Echocardiogram**

1. To be performed by an experienced laboratory, using standard recognised protocol, because of possible difficulty with interpretation.

2. Aim should be to achieve 85% of predicted heart rate, as for stress electrocardiogram, without developing any symptoms or signs of myocardial ischaemia.

3. For applicants undergoing pharmacological stress echocardiography using sympathomimetic stressors, atropine may be administered following the maximal dose of dobutamine.

4. A positive stress echocardiogram is defined by severe or extensive new wall motion abnormalities, horizontal or down sloping ST segment depression > 1mV at 0.08 seconds after the J point compared with baseline; new ST segment elevation >0.1mV in applicants without a previous myocardial infarction, or significant tachyarrhythmia. Applicants who have a positive stress Echocardiogram should not exercise privileges until their cardiac status is clarified.

5. If an applicant is unable to achieve 85% of predicted heart rate or if the test is terminated for other reasons, the reasons for ceasing the test must be stated.

**Stress Nucleotide (Thallium or Sestimibi) Scan**


2. Bruce protocol stress to a minimum of 85% of predicted maximal heart rate and at least nine minutes exercise time.

3. Applicant should have been continuously in the time zone where testing is performed for at least 72 hours prior to the test.

4. Applicant should continue to take his/her usual medication(s) until tested.

5. Re-injection or 24 hour view if defects are present. This additional requirement may be omitted if the defect(s) is/are demonstrated to be non-reversible.
6. A satisfactory exercise nucleotide scan is recorded when the exercise or nucleotide scanning does not reveal defects consistent with myocardial ischaemia. Applicants who have a positive stress radio nucleotide scan should not exercise privileges until their cardiac status is confirmed.

**Coronary Angiogram**

1. The angiogram is to demonstrate all major vessels, their tributaries, and grafts if present.
2. Left ventriculogram should be performed.
3. A significant stenosis is considered to be present if there is greater than 50% narrowing of any artery.
4. A satisfactory coronary angiogram is recorded when there is no significant stenosis seen in the native coronary circulation and/or where coronary artery bypass grafts appear without discernible wall pathology or have only minor irregularities.

**Gated Blood Pool Scan**

1. Measurement of the ejection fraction gated heart pool scan may be required for Class 1 and 3 Medical Certificates.
2. The scan should show an ejection fraction greater than 45%.
3. Measurement of the ejection fraction by echocardiogram is permitted for Class 2 Medical Certificates.

**Electron Beam Computed Tomography and ‘Calcium Scores’**

1. Aviation Medicine is considering the potential use of this technology. However, in common with other regulators, it does not currently accept the results of these investigations as substitutes for any other required tests.

**Cardiologist’s Assessment**

This is to include recording of:

1. Clinical status.
2. Control of risk factors, including smoking and obesity.
3. Hyperlipidemia, hypertension, or diabetes mellitus.
4. A satisfactory gated heart pool scan, which should demonstrate no wall motion abnormalities associated with moderate hypokinesis.
5. An overall ejection fraction greater than 45%.
6. An acceptable fasting lipid profile, where total cholesterol is less than 5.5 mmol/L and the HDL fraction is greater than 1.0 mmol/L. Note that both HDL and LDL fractions should be recorded.

**Cardiologist’s Review**

This is to include recording of:

1. Clinical status.
2. Control of risk factors, including smoking and obesity.
3. Hyperlipidemia, hypertension, or diabetes mellitus.
4. An overall ejection fraction greater than 45%.
5. An acceptable fasting lipid profile, where total cholesterol is less than 5.5 mmol/L and the HDL fraction is greater than 1.0 mmol/L. Note that both HDL and LDL fractions should be recorded.

**Issue of Aviation Medical Certificate Following Myocardial Infarction**

**Class 1 or 3 Medical Certificates**

Following the infarction, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months after the event.

**Recertification**

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).
- Gated ejection fraction estimation
- Coronary angiogram, unless this has already been undertaken and reported as satisfactory.

If all of the above investigations are satisfactory, the subject may be recertificated for six months without restriction (Class 1) or nine months without restriction (Class 3).
Subsequent Reviews

12 months post myocardial infarction:
- Routine aviation medical examination
- Cardiologist’s review
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

At six-monthly intervals thereafter:
- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.

At two-yearly intervals thereafter:
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

Class 2 Medical Certificate

Following the infarction, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months after the event.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s review
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).
- Gated ejection fraction estimation.

If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction.

Subsequent Reviews

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG and report.

Five-yearly:
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).
**Issue of Aviation Medical Certificate Following Coronary Artery Bypass Graft (CABG).**

**Class I or 3 Medical Certificates**

Following the graft, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months after the surgery for Class1 or for three months after the surgery for Class 3.

**Recertification**

Investigations required for recertification are:
- Routine aviation medical assessment
- Cardiologist’s assessment
- Stress nucleotide scan
- Gated ejection fraction estimation.

If all of the above investigations are satisfactory, the subject may be recertificated for six months without restriction (Class1) or for nine months without restriction (Class 3).

**Subsequent Reviews**

12 months post coronary artery bypass graft:
- Routine aviation medical examination
- Cardiologist’s review
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under *Stress Echocardiogram*).

At six-monthly intervals thereafter:
- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.

At two-yearly intervals thereafter:
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under *Stress Echocardiogram*).

**Note:** Angiography is no longer routinely required each 5 years, but may be required if an applicant develops new symptoms or other evidence suggesting worsening IHD despite treatment.
Class 2 Medical Certificate

Following the graft, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months after the surgery.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG and report.

Five-yearly:

- Stress nucleotide scan or stress echocardiogram.

Issue of Aviation Medical Certificate Following Coronary Artery Angioplasty

Class I and 3 Medical Certificates

Following angioplasty, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months post angioplasty for Class 1, three months post angioplasty for Class 3. While preliminary data suggests that drug-eluting starts may reduce the incidence of post angioplasty stenosis, CASA is not prepared to reduce the six-month post treatment period at this time. CASA will continue to monitor this issue.
Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram)
- Gated blood pool scan.

If all of the above investigations are satisfactory, the subject may be recertificated for six months without restriction (Class 1) or for nine months without restriction (Class 3).

Subsequent Reviews

12 months post angioplasty:

- Routine aviation medical examination
- Cardiologist's review
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

At six-monthly intervals thereafter:

- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.

At two-yearly intervals thereafter:

- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

Note: Angiography is no longer routinely required each 5 years, but may be required if an applicant becomes symptomatic or has other evidence suggesting worsening HID despite treatment.
Class 2 Medical Certificate

Following the angioplasty, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months post angioplasty.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram)
- Gated ejection fraction estimation.

If all of the above investigations are satisfactory, the subject may be recertificated for six months without restriction.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.

Five-yearly:

- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

Issue of Aviation Medical Certificate Following Evidence of Ischaemic Heart Disease

Class I or 3 Medical Certificates

When an applicant presents with:

- Ischaemic heart disease symptoms such as angina, arrhythmia; or
- Cardiac failure or other evidence of ischaemic heart disease, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.
Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under **Stress Echocardiogram**)
- Gated heart pool scan or ejection fraction by radio nucleotide scan.

If the stress nucleotide scan or stress echocardiogram is positive, proceed to an angiogram.

If all investigations up to and including the stress nucleotide scan or stress echocardiogram are negative, the subject may be recertificated.

If the stress nucleotide scan or stress echocardiogram is positive but a subsequent angiogram is reported as satisfactory, the applicant may be recertificated for six months.

Subsequent Reviews

At six-monthly intervals thereafter:
- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.

At two-yearly intervals thereafter:
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under **Stress Echocardiogram**).

Class 2 Medical Certificate

When an applicant presents with:
- Ischaemic heart disease symptoms such as angina, arrhythmia; or
- Cardiac failure or other evidence of ischaemic heart disease, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.
Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist's assessment
- Stress ECG.

If the stress ECG is negative, the subject may be recertificated without restriction.

If the stress ECG is positive, proceed to a stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

If the stress nucleotide scan is or stress echocardiogram is negative, the subject may be recertificated.

If the stress nucleotide scan or stress echocardiogram is positive, proceed to an angiogram.

Subsequent Reviews

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.
2.2.7 Valvular Heart Disease

Uncorrected Aortic Incompetence

Class 1 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist's review
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist reports are satisfactory, the applicant may be recertificated for a period of one year (class 1 applicants) or two years (class 2 applicants).

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- ECG.
Class 2 Medical Certificate

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist reports are satisfactory, the applicant may be recertificated for a period of two years.

Subsequent Reviews
- Two-yearly review by cardiologist.

Corrected Aortic Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.
Where a tissue valve is used and there is no requirement for anticoagulation and certification may be unrestricted.

Where a mechanical valve is used, the applicant is to have evidence of clinically satisfactory, well-controlled anticoagulation and Class 1 medical certification will be restricted to multi-crew operations.

**Subsequent Reviews**

Classes 1, 2 and 3 require yearly review by a cardiologist.

**Uncorrected Aortic Stenosis**

**Class 1, 2 and 3 Medical Certificates**

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

**Recertification**

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Electrocardiogram
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and the cardiologist’s report are satisfactory, the applicant may be recertificated for a period of 12 months.

**Subsequent Reviews**

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram
- Chest X-ray.
Corrected Aortic Stenosis

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and the cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.

Where a tissue valve is used and there is no requirement for anticoagulation, medical certification may be unrestricted.

Where a mechanical valve is used, the applicant is to have evidence of clinically satisfactory well-controlled anticoagulation, and Class 1 medical certification will be restricted to multi-crew operations.

Subsequent Review

Class 1, 2 and 3 all require annual review by a cardiologist.
Uncorrected Mitral Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months without restriction.

Subsequent Reviews

For **Class 1 and 3 Medical Certificates**, at annual intervals thereafter:
- Routine aviation medical examination
- ECG
- Cardiologist’s review.

For **Class 2 Medical Certificate**, at two-yearly intervals thereafter:
- Routine aviation medical examination
- Cardiologist’s review.
Corrected Mitral Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Doppler echocardiogram.

If the valve is replaced, a significant risk of embolism remains, particularly where a mechanical valve implant has been used.

For mechanical valves, Class 1 applicants will be assessed as unfit. If reports are favourable, Class 2 applicants may be recertificated for 12 months restricted to “as or with qualified co-pilot only” and Class 3 applicants may be recertificated for 12 months, with appropriate restrictions. Assessments will not be made until at least six months post surgery.

For tissue valves, if reports are satisfactory, all classes of applicants may be recertificated. For Class 1, recertification will be for up to six months only and will be restricted to operation “as or with qualified co-pilot only”. For Class 2, recertification will be possible for up to 12 months and will be restricted to operations “as or with qualified co-pilot only”. For Class 3, recertification will be possible for up to 12 months with appropriate restrictions. Assessments will not be made until at least six months post surgery.

For valve repairs, if reports are favourable, Class 1 applicants may initially be recertificated for six months, and Class 2 and Class 3 applicants may be recertificated for 12 months.

Subsequent Reviews

Valve Replacements:

- For Class 1: Six-monthly routine aviation medical examination. All applicants require cardiologist’s review with Doppler echocardiogram.
- For Classes 2 and 3: Annual routine aviation medical examination. All applicants require cardiologist’s review with Doppler echocardiogram.
Valve Repairs:

All applicants require a routine annual aviation medical examination and cardiologist’s review with Doppler echocardiogram.

Uncorrected Mitral Stenosis

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

Applicants with mild uncorrected mitral stenosis (where the valve area is greater than 1.5 cm², the heart is in sinus rhythm, where there is no history of atrial fibrillation and the left atrial diameter is less than 4.5 cm), are permitted recertification for 12 months.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- ECG.
Corrected Mitral Stenosis

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA. This will not be considered until at least three months following mitral valvotomy or replacement.

Recertification

Investigations required for recertification following mitral valvotomy are:

- Routine aviation medical examination
- Cardiologist’s assessment, which is to include assessments of the incompetence and stenosis
- Doppler echocardiogram
- ECG
- Chest X-ray.

If all of the investigations and cardiologist’s reports are satisfactory following mitral valvotomy, the applicant may be recertificated for a period of 12 months.

Following mitral valve replacement.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Doppler echocardiogram
- ECG
- Chest x-ray.

Following mitral valve replacement, Class 1 applicants will be assessed as unfit because of the increased risk of embolism. If reports are favourable, Class 2 applicants may be recertificated for 12 months, restricted to operation “as or with qualified co-pilot only” and Class 3 applicants may be recertificated for 12 months, with appropriate restrictions.
Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram.
2.2.8 Bundle Branch Blocks

**Partial or Complete Left Bundle Branch Block (Not Including Left Anterior Hemiblock)**

**Class 1, 2 & 3 Medical Certificates**

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

**Recertification**

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan
- Doppler echocardiogram
- Left ventricular gated blood scan to measure ejection fraction
- 24 hour Holter monitor recording.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for 12 months.

**Subsequent reviews**

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review.

If reports continue to be completely satisfactory for five years, applicants may then be recertificated without restriction.

**Incomplete Right Bundle Branch Block**

No specific requirements.
Complete Right Bundle Branch Block

Class 1, 2 and 3 Medical Certificates

**Note:** This may be a normal variant in young applicants. A cardiologist’s opinion should be obtained in these cases.

Otherwise, on diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Echocardiogram
- Stress ECG.

If all of the investigations and cardiologist's reports are satisfactory, the applicant may be recertificated for the maximum period permitted for the relevant medical certificate.

Left Anterior Hemiblocks

Class 1, 2 and 3 Medical Certificates

If this is a newly acquired condition, a stress ECG should be performed. If this is normal, there is no requirement for further reviews.

Atrio-Ventricular Blocks

**First Degree**

No specific requirements.

**Second Degree — Class 1, 2 and 3 Medical Certificates**

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.
Recertification
Investigations required for recertification are:

- Cardiologist’s assessment
- 24 hour Holter monitor recording
- Stress ECG.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for 12 months. Applicants with untreated heartblocks of 2:1 or greater will not be recertificated for any class of medical certificate.

Subsequent Reviews
An annual ECG is required.

Third Degree Heart Block
Restricted certification may be available with the use of pacemakers.

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification
Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress ECG (to assess cardiac function)
- 24 hour Holter monitor recording.

Note: The pacemaker is to be dual chambered with bipolar leads. The pacemaker is to have a technical check every 12 months, with the outcome reported to the Aviation Medicine Section.
Recurrent Atrial Fibrillation

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment, with particular reference to history and presence of any congenital abnormalities
- ECG
- 24 hour Holter monitor
- Exercise echocardiogram
- Biochemical profile, including: thyroid function studies, liver function studies, serum magnesium and potassium levels, Fasting Blood Glucose.
- Haemoglobin estimation.

If drug treatment is required, there must be adequate rate control (as assessed by a cardiologist), without significant side effects. There should be no underlying structural heart disease. In these circumstances, all applicants may be recertificated for 12 months without restriction, unless prescribed warfarin. Where Warfarin is prescribed, CASA will require evidence of good INR control.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review.
Atrial Flutter

Class 1, 2 and 3 Medical Certificates

On diagnosis the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment, with particular reference to history and to presence of any congenital abnormalities
- 24 hour Holter monitor
- Exercise echocardiogram
- Biochemical profile, including: thyroid function studies, liver function studies, serum magnesium and potassium levels, Fasting Blood glucose
- Haemoglobin estimation.

If drug treatment is required, there must be adequate rate control (as assessed by a cardiologist), without significant side effects. There should be no underlying structural heart disease. In these circumstances, all applicants may be recertificated for 12 months without restriction, unless prescribed warfarin.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist's review.
Wolff-Parkinson-White Syndrome

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Electrophysiological studies.

If WPWS is confirmed, the applicant is assessed as unfit until radiofrequency ablation of aberrant conduction pathways has been performed and the treating cardiologist has certified that conduction has been normalised. All applicants may then be recertificated for six months without restriction.

Subsequent Reviews

At six months, 12 months and 24 months post successful radiofrequency ablation of aberrant conduction pathways, the following are required:
- Routine aviation medical examination
- Cardiologist’s review.

If there is no recurrence of abnormal conduction within 24 months of successful radiofrequency ablation, further recertification without restriction should follow the normal pattern for the applicant’s age and class of medical certificate.

Corrected Congenital Heart Anomalies

In many cases, residual haemodynamic defects may preclude medical certification at any level for these applicants. Each case will be dealt with on its individual merits. A comprehensive cardiological work-up and report should be completed and full details forwarded to Aviation Medicine Section for assessment.

Other Cardiological Abnormalities

These can be extremely varied and range from trivial conditions to those which absolutely preclude medical certification at any level for these applicants. Each case will be dealt with on its individual merits. A comprehensive cardiological work-up and report should be completed and full details forwarded to Aviation Medicine Section for assessment.
2.2.9 Cardiomyopathies

Dilated Cardiomyopathy

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Two recordings of 24 hours Holter monitor studies
- Gated blood pool scan.

If ejection fraction is greater than 45% with no symptoms and a normal Holter monitor report, then a special Class 1 Certificate, restricted to multi-crew operations, on a planned six-monthly renewal assessment basis, may be allowed.

For Class 2 and 3 applicants who meet the same criteria, unrestricted certification for six months at a time may be allowed.

Subsequent Reviews

<table>
<thead>
<tr>
<th>Class</th>
<th>Six-monthly cardiologist’s review with gated blood pool scan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classes 2 and 3</td>
<td>Unrestricted certification may be issued, with six monthly cardiologist’s review.</td>
</tr>
</tbody>
</table>

In all cases, if investigations/assessments are completely normal on five consecutive occasions, the applicant may thereafter be recertificated on the basis of meeting routine medical requirements, without additional assessments.
Hypertrophic Cardiomyopathy

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA. Recertification will not normally be possible for Class 1 or 3, but all cases will be assessed on their individual merits.

Recertification

In all cases, further certification will be appropriately restricted.

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment, including detailed family history
- Stress ECG
- Doppler echocardiogram
- 24 hour Holter monitor recording.

If all of the investigations and the cardiologist’s report are satisfactory, recertification may be available.

Subsequent Reviews

Requirements will be individually determined and notified.
2.2.10 Cardiac Transplant

Class 1 applicants will be assessed as unfit.

Class 2 and 3

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are.

- Routine aviation medical examination
- Cardiologist’s assessment
- Coronary angiogram (for detection of atherosclerosis)
- 24 hour Holter monitor recording
- Doppler echocardiogram.

If all of the investigations and the cardiologist’s report are satisfactory, Class 2 and Class 3 applicants may be recertificated on an individually determined basis.

Subsequent Reviews

At six-monthly intervals:

- Routine aviation medical examination
- Cardiologist’s review.

At annual intervals:

- Stress nucleotide scan
- Coronary angiogram (to assess coronary atherosclerosis)
- Doppler echocardiogram.
2.3.1 Introduction

This section details the assessment procedures for pilots, other aircrew members and air traffic controllers who suffer or who may suffer from lung or respiratory system disease.

The aim of the respiratory assessment within the aeromedical examination is to ensure that applicants do not suffer from lung or respiratory system disease which places them at an unacceptable risk of incapacitation, or which may otherwise jeopardise the safety of air navigation.

2.3.2 The Respiratory Standard – CASR Part 67

CASR 67 The respiratory standards are found in the following paragraphs of CASR Part 67:

- CASR 67.150 For medical standard 1
  - CASR 67.150
  - Table 67.150
  - 1.12 – 1.13

- CASR 67.155 For medical standard 2
  - CASR 67.155
  - Table 67.155
  - 2.12

- CASR 67.160 For medical standard 3
  - CASR 67.160
  - Table 67.160
  - 3.12

2.3.3 Assessment

All applicants for Australian aviation medical certificates are administered a comprehensive screening questionnaire physically examined by a DAME, and required to undertake a number of screening tests.

When conducting the respiratory component of the aeromedical examination, the DAME should note the presence of relevant risk factors for the development of lung and respiratory system disease and the presence of signs and symptoms suggestive or diagnostic of such conditions.

For example: risk factors for the development of asthma include:

- Family history of asthma
- Personal or family history of smoking
- Other allergies or atopic symptoms.
2.3 Respiratory Disease

FEV₁ is measured at the original assessment and each renewal assessment. (Note spirometers should be calibrated to BTPS). Chest X Rays may be required if the applicant’s history or physical signs so indicate. This is likeliest in smokers or ex-smokers. Routine Chest X Ray is not required.

Further investigation of respiratory abnormalities may include flow loop spirometry, measurement of diffusion capacity, blood gas estimation (both at ground level and at simulated altitude) and various forms of imaging of the respiratory system.

Referral to a consultant respiratory physician may be required to confirm a diagnosis or to resolve concern over a differential diagnosis. CASA may also require an applicant for medical certification to be assessed by a consultant respiratory physician as part of its consideration of an applicant’s fitness for aeromedical certification.

2.3.4 Documentation of Respiratory Conditions

Many respiratory conditions are principally diagnosed and classified on the basis of history. DAMEs should take a careful and thorough clinical history before reaching a respiratory diagnosis, particularly a diagnosis that may significantly affect an applicant’s employment prospects. Particular attention must be paid to chronic use of any medications that are incompatible with the exercise of the privileges of licensure. Also see Section 2.13 Medication – Drugs and Flying/Controlling.

2.3.5 Asthma

\textit{Diagnosis and assessment}

In the first instance care should be taken to ensure an accurate diagnosis of asthma, noting that the criteria of recurrent, reversible airways obstruction should be met. Subsequent assessment of asthma should distinguish between severity and control. Severity is in part determined by the amount of treatment required to maintain control (as evidenced by type and quantity of prescription or over-the-counter medications required to control asthma symptoms, the requirement for oral steroid medication and the number of Emergency Room presentations or hospital admissions due to asthma). CASA will not usually certificate applicants who suffer from severe asthma. Uncontrolled asthma, regardless of severity, is not acceptable in the aviation environment, and will preclude the issuing of any class of CASA medical certificate.

Applicants who have asthma which is well controlled (if necessary using anti-inflammatory therapy) may be eligible for any class of medical certificate. Applicants with mild well controlled asthma maybe required to undergo periodic spirometry. In the case of applicants with moderate well controlled asthma, periodic assessment by a respiratory physician may be required. CASA will notify specific requirements on a case-by-case basis.
2. Medical Aspects

2.3 Respiratory Disease

Asthma severity

Severe asthma

Applicants with severe asthma experience continuous symptoms, limited physical capacity, and have a FEV₁ or peak flow measurement of less than or equal to 60% predicted. Peak flow variability may be greater than 30%. Treatment requirements of patients with severe asthma will likely include moderate or high doses of inhaled corticosteroid, with or without long-acting beta-agonist, oral theophylline, or inhaled anticholinergic. Some applicants may require oral corticosteroid. Patients with severe asthma may require care through hospital Emergency Rooms or even hospital admission when control of the condition is poor.

Moderate asthma

Applicants with moderate asthma generally have symptoms of airflow obstruction most of the time, and experience some impairment of physical capacity. Their FEV₁ or peak flow will be in the range 60-80% predicted, and peak flow variability may be greater than 15%. Treatment requirements will likely include low to moderate doses of inhaled corticosteroid, (e.g. beclomethasone 400-1000 micrograms per day or equivalent).

Mild asthma

Applicants with mild asthma generally have intermittent symptoms, interposed between symptom-free intervals that may be prolonged. FEV₁ and peak flows are often normal, and there may be no peak flow variability.

Asthma control

For CASA’s purposes, good control requires that, in the three months preceding assessment, the applicant:

- Has experienced no or minimal cough, wheeze or breathlessness on exercise or during the night
- Has maintained "best" pulmonary function
- Has maintained stable exercise capacity, although possibly somewhat impaired
- Has not required treatment with oral corticosteroid
- Has not required an Emergency Room visit/hospital admission for symptoms of asthma.
2.3.6 Chronic Bronchitis and Emphysema

Smokers aged 45 or more should undergo increased screening for these conditions for all classes of medical certificates. Positive findings dictate a full respiratory assessment, including a report by a respiratory physician. It is unlikely that applicants with severe chronic bronchitis or emphysema will meet the medical standard for issue of a class 1 medical certificate. However, restricted class 2 and 3 certification may be possible, on a case-by-case basis.

2.3.7 Pneumothorax

**Traumatic Pneumothorax.**

Medical certification for all classes is usually possible after review of medical reports covering precipitating factors, associated problems, extent of recovery and subsequent lung function. Full assessment by a respiratory physician may be required.

**Single Spontaneous Pneumothorax.**

An applicant who has had a spontaneous pneumothorax with full recovery and no obvious cause nor likelihood of recurrence may be assessed as fit for all classes of medical certification.

**Recurrent Spontaneous Pneumothorax.**

An applicant with recurrent spontaneous pneumothorax (defined as two or more episodes on the same side) is not usually acceptable for any class of medical certificate. If the pneumothorax has been surgically corrected by pleurodesis (mechanical or chemical) or pleurectomy, the applicant may be assessed as fit. Assessment by a respiratory physician may be required.

2.3.8 Pulmonary Tuberculosis

An applicant with active tuberculosis (but not open tuberculosis) may be medically certificated for any class provided there is adequate evidence that he/she is on appropriate therapy and there is no evidence of side effects from the therapy. Applicants with fully treated pulmonary tuberculosis should be aero medically assessed to determine the extent of lung damage/recovery. Assessment by a respiratory physician is required in all cases.
2.3.9 Sarcoidosis

Sarcoidosis is usually acceptable for all classes of medical certification, provided myocardial and other system sarcoidosis has been excluded. Reports of full cardiovascular and respiratory assessments are required.

2.3.10 Pulmonary Embolism

An applicant who develops pulmonary embolism must be comprehensively investigated to determine if there are significant underlying reasons for the episode. Once recovery is complete and the applicant demonstrates normal pulmonary function (including normal blood gases), unrestricted medical certification at any class is usually possible. CASA will not usually consider re-certification until at least 8 weeks after the episode. Pilots who are prescribed long-term anticoagulation with warfarin following a pulmonary embolism may be granted conditional certification.

2.3.11 Fibrosing Lung Diseases

Applicants with these conditions require full respiratory assessment, including blood gas estimation. Thereafter, certification may be possible on a case-by-case basis.

2.3.12 Obstructive Sleep Apnoea (OSA)

This condition is often under-reported because applicants fear loss of certification. DAMEs must specifically inquire whether or not the applicant has conditions that suggest OSA eg, loud habitual snoring, witnessed apnoea. Where the diagnosis is entertained, the Epworth Sleepiness Scale must be administered to the applicant. If the resulting score is 16 or more, assessment by a sleep physician is required. Following definitive diagnosis of OSA, unrestricted medical certification at all classes is usually possible after appropriate corrective treatment has been instituted and demonstrated to be successful. This usually requires reports from a sleep physician, before and after treatment.

Also see ‘Sleep Disorders’ in Section 2.6.17 (Psychiatry).

The Epworth Sleepiness Scale provides an estimate of the likelihood of dozing or falling asleep, in contrast to just feeling tired.

Applicants suspected of suffering from OSA should be questioned about their sleepiness during normal activities. (Even if the applicant has not recently undertaken some of these activities, they should be asked to estimate their relevant chance of dozing based on prior experiences).
2.3 Respiratory Disease

Use this scale to allocate scores under ‘chance of dozing’ in each situation described.

- 0 = no chance of dozing
- 1 = slight chance of dozing
- 2 = moderate chance of dozing
- 3 = high chance of dozing

<table>
<thead>
<tr>
<th>Situation</th>
<th>Chance of dozing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting and reading</td>
<td></td>
</tr>
<tr>
<td>Watching television</td>
<td></td>
</tr>
<tr>
<td>Sitting inactive in a public place (e.g. a cinema or meeting)</td>
<td></td>
</tr>
<tr>
<td>As passenger in a car for &gt; 1 hour</td>
<td></td>
</tr>
<tr>
<td>Lying down to rest in the afternoon when circumstances permit</td>
<td></td>
</tr>
<tr>
<td>Sitting and talking to a companion</td>
<td></td>
</tr>
<tr>
<td>Sitting quietly after an alcohol-free lunch</td>
<td></td>
</tr>
<tr>
<td>In a car, while stopped briefly in heavy traffic</td>
<td></td>
</tr>
<tr>
<td><strong>Total Epworth Sleepiness Score</strong></td>
<td></td>
</tr>
</tbody>
</table>

If the score is 16 or more, assessment by a sleep physician is required.

(The Epworth Sleepiness Scale is reproduced with the permission of Dr M.W. Johns, A new method for measuring daytime sleepiness: the Epworth sleepiness scale. Sleep, 14(6):540-545.)
2.4.1 Introduction

This section details the assessment of pilots, other aircrew members and air traffic controllers who suffer or who may suffer from endocrine disease or from metabolic disorders.

The aim of the endocrine assessment within the aeromedical examination is to ensure that applicants do not suffer from endocrine or metabolic conditions which place them at an increased risk of incapacitation or which may produce a decrement in physiological or psychological function sufficient to jeopardise the safety of air navigation. In conducting the aeromedical examination, the DAME will recognise that an individual who holds an unrestricted medical certificate must be capable of performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities may include flight (either as a private or professional pilot):

- For prolonged duration, often as part of a shift roster
- Subject to disrupted sleep and time zone changes
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning

A number of these stressors may also affect Air Traffic Controllers.
2.4.2 The Endocrine Standard – CASR Part 67

The endocrine standards are found in the following paragraphs of CASR Part 67:

CASR 67.150 For medical standard 1

Table 67.150
1.16

CASR 67.155 For medical standard 2

Table 67.155
2.15

CASR 67.160 For medical standard 3

Table 67.160
3.15

**For Medical Standard 1:**

“A person suffering from diabetes mellitus may be assessed as meeting medical standard 1 if the condition is satisfactorily controlled without the use of any anti-diabetic drug.”

**For Medical Standard 2:**

“A person who suffers from diabetes mellitus may be assessed as meeting medical standard 2 if:

a. The condition is satisfactorily controlled without the use of any anti-diabetic drug; or
b. If an oral anti-diabetic drug is used to control the condition:
   i. The condition is under on-going medical supervision and control; and
   ii. The oral drug is approved by CASA.”

**For Medical Standard 3:**

“A person who suffers from diabetes mellitus may be assessed as meeting medical standard 3 if:

a. The condition is satisfactorily controlled without the use of any anti-diabetic drug; or
b. If an oral anti-diabetic drug is used to control the condition:
   i. The condition is under on-going medical supervision and control; and
   ii. The oral drug is approved by CASA.”
2.4.3 Assessment of the Endocrine System

All applicants for Australian aviation medical certificates are required to complete a comprehensive screening questionnaire, to be physically examined by a DAME, and to undertake urinalysis for the presence of urinary glucose. In addition, applicants for Class 1 and Class 3 medical certificates are required to undergo fasting blood glucose estimation at the same time as they undergo five-yearly fasting lipid estimation. (CASA intends to introduce a requirement that applicants for Class 2 medical certificates will also be screened five yearly for diabetes mellitus by means of fasting blood glucose estimation).

When conducting an aeromedical examination, the DAME should note the presence of relevant risk factors for the development of endocrine or metabolic diseases and the presence of signs and symptoms suggestive or diagnostic of such conditions. Where such an endocrine condition is confirmed, evidence of secondary pathology or of accompanying complications should be sought and documented.

For example, risk factors for the development of diabetes mellitus include:

- Ethnic group
- Age >55 years
- Positive family history
- Obesity or significant overweight
- Abnormality of glucose tolerance
- Pregnancy
- Hypertension, dyslipidaemia, or clinical macrovascular disease
- Lack of regular exercise
- Use of diabetogenic medications.

Evidence of pathology secondary to diabetes mellitus may include vascular disease, retinal disease or renal disease.
2.4.4 Diabetes Mellitus and Impaired Glucose Tolerance

The incidence and prevalence of diabetes mellitus (of all types) has increased considerably in Australia in recent years. Up to 7.5% of the population now meets the diagnostic criteria for the condition (see Biochemical Investigations below). This is significant for aviation safety as diabetes mellitus is disqualifying for certification for aviation and air traffic control duties. The major aeromedical risk of diabetes relates to incapacitation (either overt or subtle), while it is also a major independent risk factor for a number of other incapacitating conditions—for example, stroke, acute myocardial infarction.

However, there is provision in the Civil Aviation Regulations for ‘a person who suffers from diabetes to be assessed as meeting the medical standard if the approved person conducting the relevant examination is satisfied that the diabetes is satisfactorily controlled without the use of an anti-diabetic drug’ or, for Class 2 and 3 medical certificate applicants, ‘where an oral anti-diabetic drug (approved by the Director of Aviation Medicine) is used to control the condition, the person provides evidence that he or she is undertaking on-going supervision and control of the condition’.

Classification of Diabetes Mellitus

Diabetes/diabetes precursor conditions are conventionally classified into four major types:

- Type 1 (absolute reduction in insulin production)
- Type 2 (resistance to the effects of insulin)
- Gestational
- Impaired glucose tolerance/impaired fasting glycaemia.

The majority of Type 1 diabetes mellitus sufferers use insulin regularly to manage the condition. Sufferers of Type 2 diabetes mellitus utilise a variety of management strategies: diet, oral hypoglycaemic agents and insulin, either singly or in combination.

Approximately one third of patients diagnosed with impaired glucose tolerance will subsequently have their glucose biochemistry return to normal, one third will continue to have impaired glucose tolerance and the remainder will eventually become sufferers of frank diabetes. Of aeromedical concern is the finding that all persons with impaired glucose tolerance have a statistically significant increase in their risk of developing ischaemic cardiovascular disease.
Biochemical Investigations

For medical certification purposes, any clinical suspicion of diabetes mellitus (such as urinalysis showing the presence of glycosuria) should be confirmed biochemically.

CASA recognises the following biochemical criteria, documented on at least two separate days, as confirming the diagnosis of diabetes mellitus:

- Fasting venous plasma glucose >6.9 mmol/l (less than 5.5 mmol/l—diabetes unlikely)
- Casual (random) venous plasma glucose >11.1 mmol/l (less than 5.5 mmol/l—diabetes unlikely).

Equivocal results of a fasting venous plasma glucose or casual venous plasma glucose estimation (between 5.5 and 6.9 mmol/l fasting or between 5.5 and 11.0 mmol/l casual) may indicate impaired glucose tolerance. In the event of an equivocal blood glucose result, DAMEs should order a 75 gram oral glucose tolerance test performed according to WHO 1999 guidelines and assessed according to the criteria in Table 2.4-1.

**Table 2.4-1: WHO oral glucose tolerance test assessment criteria 1999**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Criteria—Venous plasma Glucose concentration (mmol/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes mellitus</td>
<td></td>
</tr>
<tr>
<td>Fasting value</td>
<td>≥7.0 or</td>
</tr>
<tr>
<td>2 hr post glucose load</td>
<td>&gt;11.1</td>
</tr>
<tr>
<td>Impaired glucose tolerance</td>
<td></td>
</tr>
<tr>
<td>Fasting value</td>
<td>&lt;7.0 and</td>
</tr>
<tr>
<td>2 hr post glucose load</td>
<td>7.8–11.0</td>
</tr>
<tr>
<td>Impaired fasting glucose</td>
<td></td>
</tr>
<tr>
<td>Fasting value</td>
<td>6.1–6.9 and</td>
</tr>
<tr>
<td>2 hr post glucose load</td>
<td>&lt;7.8</td>
</tr>
<tr>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>Fasting value</td>
<td>&lt;6.1 and</td>
</tr>
<tr>
<td>2 hr post glucose load</td>
<td>&lt;7.8</td>
</tr>
</tbody>
</table>
Other Investigations

All applicants for medical (re-)certification who have either diabetes mellitus or impaired glucose tolerance must also provide to the DAME the results of all glycosylated haemoglobin (HbA1c) estimations performed in the previous twelve months. A minimum of three estimations is required, with the most recent being performed no more than one month prior to DAME examination. (HbA1c results should be reported in % HbA1c and should indicate the laboratory reference range for the estimations.)

In addition, CASA requires the following information and test results from applicants with diabetes mellitus:

- A recent report (within three months) from an endocrinologist or specialist physician:
  - Current status of control of diabetes
  - Whether the applicant has any history of hypoglycaemia/hyperglycaemia in preceding 12 months.
  - If so, whether there was any requirement for external intervention or assistance.

- A copy of the applicant’s diary of ambulant blood glucose monitoring throughout the three months immediately prior to DAME examination. Desirable ranges are:
  - No readings below 2.8 mmol/litre
  - At least 90% of values between 5.5 mmol/litre and 10 mmol/litre.

- A copy of the applicant’s most recent annual ophthalmological assessment detailing:
  - Clinical status
  - Visual acuity (with and without correction)
  - Presence of retinal disease
  - Presence of other ophthalmic pathology.

- A copy of a recent cardiovascular assessment by a cardiologist or specialist physician, including results of resting ECG and interval Stress ECG. The report should detail:
  - Clinical status
  - Presence and control of risk factors—for example, hypertension, smoking, hyperlipidaemia (total cholesterol, LDL and HDL)
  - Assessed risk of any acutely disabling cardiovascular event.

- The result of recent renal function tests, including 24 hour urine protein excretion.

- Certification that the applicant has completed and understood a course of diabetic management education.

There are no specific requirements for applicants who have impaired glucose tolerance or impaired fasting glycaemia where these conditions have not progressed to frank diabetes mellitus. However, CASA advises DAMEs to counsel affected applicants on the potential aeromedical certification consequences of their progression to frank diabetes mellitus and to initiate or refer them for appropriate clinical management.
### Medical Certification of Persons with Diabetes Mellitus

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

Requirements for medical (re-)certification are set out in the following paragraphs.

1. **Persons with diabetes mellitus controlled by diet may receive medical certification at Class 1, 2 or 3 provided they meet the following criteria:**
   - Evidence of stable blood glucose control:
     - Glycosolated Haemoglobin (HbA1c) taken within one month of assessment <7.5%.
     - Satisfactory reports as detailed under Other Investigations
   - Absence of complications that could result in sudden or subtle incapacitation when exercising the privileges of a licence.

2. **Persons with diabetes mellitus controlled by diet and oral hypoglycaemic drug(s) may receive unlimited medical certification at Class 2 or 3 levels only. Such persons who seek Class 1 (re-)certification may be offered (re-)certification with an ‘as or with co-pilot’ restriction. Prior to their (re-)certification, CASA requires objective evidence that these applicants meet the following criteria:**
   - No unacceptable side effects from drugs
   - Evidence of stable blood glucose control
     - No episode of symptomatic hypoglycaemia during the preceding 12 months
     - Glycosolated Haemoglobin (HbA1c), taken within preceding month <7.5%
     - Satisfactory reports as detailed in the previous section, Other Investigations
   - Absence of neurological, cardiovascular, ophthalmological, renal or other complications of diabetes mellitus that could result in sudden or unpredictable incapacitation when exercising the privileges of a licence.

3. **Persons with diabetes mellitus who require insulin treatment do not meet the mandatory medical standards and are not fit for medical certification. However, in appropriate cases, the Director of Aviation Medicine may exercise discretion and issue a Class 2 medical certificate endorsed with the conditions ‘as or with co-pilot only’ and ‘valid in Australian airspace only’. Prior to such certification, CASA requires:**
   - Evidence of stable blood glucose control
     - No episode of symptomatic hypoglycaemia requiring intervention by others in the preceding 12 months
     - Serial Glycosolated Haemoglobin (HbA1c) estimations at two month intervals over the preceding 6 months—all results <7.5%
     - Satisfactory reports as detailed in the previous section, Other Investigations
Absence of neurological, cardiovascular, ophthalmological or renal complications of diabetes that could result in sudden or unpredictable incapacitation when exercising the privileges of a licence.

**Special Glucose Level Monitors**

Individuals with diabetes mellitus who receive aeromedical (re-)certification must possess and use a memory chip glucose meter for ambulatory blood glucose monitoring. The meter, together with a readily absorbable source of glucose, must be carried by the applicant while exercising the privileges of a licence. (When real-time ambulatory glucose monitoring becomes readily available in Australia, CASA may require this form of monitoring instead of monitoring with memory chip glucose meters.)

**Change in Treatment**

When an applicant’s oral hypoglycaemic medication is changed, or when its dosage is changed, he or she must not exercise the privileges of an aviation licence until the attending medical practitioner supervising the medication is satisfied that he or she is again stable and a DAME has recertified his or her fitness in accordance with CASA’s relevant medical standards.

**2.4.5 Thyroid Disorders**

The major aeromedical concern accompanying thyroid disease is the potential for abnormally high or low levels of thyroid hormone to affect an applicant’s cognitive function. Thyroid tumours have the potential to cause local symptoms or to metastasise to critical locations.

**Investigation**

Clinical suspicion of thyroid disease should be confirmed by appropriate investigations. These may include various imaging techniques, the use of fine needle biopsy, and biochemical thyroid function studies. CASA requires the results of thyroid function tests to establish that applicants are euthyroid prior to consideration for medical (re-)certification.
Medical Certification of Applicants Suffering from Thyroid Disorders

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. Requirements for medical (re-)certification are set out in the following paragraphs.

Goitre

Persons with goitre are acceptable for medical certification provided that there is no evidence of thyroid dysfunction nor of vascular or airways obstruction.

Hypothyroidism

Persons who are hypothyroid may be medically certificated provided Thyroid Function Tests (TFTs) demonstrate that adequate replacement therapy has been instituted and control maintained. TFTs should be performed annually for the first three years following initial diagnosis and periodically thereafter, as determined on a case-by-case basis, with serial results submitted with requests for medical re-certification.

Hyperthyroidism

Persons diagnosed as suffering from hyperthyroidism may be recertified once they are stable after surgery/isotope treatment/stable on medication and TFTs demonstrate that they are euthyroid. TFTs should be performed annually for the first three years after treatment is instigated and periodically thereafter, as determined on a case-by-case basis, with serial results submitted with requests for medical re-certification.

Thyroid Cancers

Thyroid cancer is disqualifying under Civil Aviation Regulations (1988). Persons diagnosed with thyroid cancer are obliged to refrain from performing licensed duties until they have been reviewed by CASA and a clearance to resume duties has been issued. While prognosis for cancer depends on many factors¹, in most cases of thyroid cancer CASA will require documentation of successful removal of the tumour, completion of any subsequent radiotherapy, and the absence of metastatic disease before considering an applicant for (re-)certification. Under certain circumstances, conditional certification may be offered to pilots suffering metastatic disease.

¹ These factors include the type of cancer, the stage of disease when discovered, the aggressiveness of the individual cancer, cell type, the types of treatment available, co-existing diseases and the general health of the individual.
2.4.6 Gout/Hyperuricemia

Gout and hyperuricaemia arouse aeromedical concerns because of the potentially incapacitating effect of acute symptomatic gout, and of the potential for high serum levels of uric acid to lead to symptomatic urolithiasis.

Investigation

Clinical suspicion of gout/hyperuricaemia should be confirmed by appropriate investigations, which may include estimations of serum uric acid levels and of urinary excretion rate. CASA will require the results of these investigations prior to considering an affected applicant for medical (re)certification. In the event that an applicant with gout suffers from abdominal pain, he/she should be investigated to exclude renal stone.

Medical Certification of Applicants Suffering from Gout/Hyperuricaemia

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

CASA will certificate applicants with gout/hyperuricaemia when the condition is satisfactorily controlled (either by diet or by allopurinol) and has been asymptomatic for at least one month. Applicants should not exercise the privileges of a licence when being treated with colchicine.

2.4.7 Hypothalamic and Pituitary Disorders

Pituitary Adenoma

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

Persons with pituitary adenoma will be assessed as unfit. Subsequent medical certification will depend on considerations of residual tumour, effects of raised intracranial pressure, any pressure effects on the optic chiasm, the effects of surgery or other treatment, the effects of any hormone excess or deficiency, and the effects of any drug therapy. In some instances, an applicant may be certificated with restrictions and appropriate surveillance following special medical assessment. Annual review, including reports from an endocrinologist or specialist physician and from an ophthalmologist, will be required.
Diabetes Insipidus

On diagnosis, inform the CASA Aviation Medicine Section and advise the applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

This condition is marked by polyuria resulting from failure of vasopressin secretion. Fluid deprivation tests are diagnostic. Treatment is with vasopressin or one of its analogues. After the treated condition has been stable for a minimum of six months, applicants may be medically certificated with restrictions and appropriate surveillance. All such cases require special medical assessment, and CASA will determine aeromedical certification, when appropriate, on a case-by-case basis.

2.4.8 Adrenocortical Disorders

Disorders of adrenocortical metabolism have the potential to incapacitate or impair the ability of a pilot or ATC to perform duties. In addition, the underlying causes of adrenocortical disorders may themselves have significant aeromedical implications.

Medical Certification of Persons Suffering from Adrenal Disorders

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

- Aeromedical disposition will depend on cause and nature of adrenal disorder. Each applicant will be considered on a case-by-case basis and full documentation will be required. Applicants should be clinically stable and adequately treated clinically for a minimum of three months before being considered for certification.

- Cushing’s Syndrome secondary to malignancy or ectopic ACTH secretion is disqualifying. Applicants with other causes may be certificated once the underlying disease has been effectively treated and hormonal status has returned to and been maintained within normal range for a minimum of three months.

- Applicants with Addison’s disease may be certificated once their underlying disease has been effectively treated and their endocrine status has returned to and been maintained within normal range for a minimum of three months.
2.4.9 Parathyroid Disorders

Parathyroid disorders and associated disorders of calcium metabolism have the potential to impair a person’s ability to control an aircraft or to act as an Air Traffic Controller. Hyperparathyroidism leading to hypercalcaemia increases the risk of renal stone formation, peptic ulcer, mental changes and cardiac arrhythmia. (Hypercalcaemia due to malignancy should be excluded in such cases.) The less common hypoparathyroidism, if associated with hypocalcaemia, may cause disabling neuromuscular irritability and abdominal cramps.

Investigations

Prior to (re-)certification of an applicant with parathyroid disease, CASA requires a report from an endocrinologist or specialist physician and copies of pre- and post-management serum calcium and PTH levels. If the applicant has suffered abdominal pain, CASA requires the results of imaging performed to exclude renal stones. Histology reports of specimens and the results of investigations to exclude underlying malignancy will assist in determination of the applicant’s fitness for medical (re-)certification.

Medical Certification of Persons Suffering from Parathyroid Disorders

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

- Applicants with hyperparathyroidism due to parathyroid adenoma may be (re-)certificated without condition(s) three months after surgical removal of the adenoma, provided that hormone and calcium levels have returned to and been maintained at normal levels. Hypercalcemia due to malignancy must be excluded. Full clinical details are required.

- Applicants with hypoparathyroidism may be (re-)certificated when estimation of hormone and calcium levels demonstrates that they have been stable on treatment (calcium and/or Vitamin D analogues) for at least three months.

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2 Note that poor venepuncture technique may lead to spurious PTH and calcium results.
2.4.10 Hyperlipidemia

Hyperlipidaemias are an important risk factor for the development of coronary artery disease, stroke and heart failure, which are important potential causes of in-flight incapacitation. Control of lipid levels is an important mechanism for reducing the risk of in-flight incapacitation due to vascular mishap. Similar considerations apply in the case of ATC staff.

Investigation

Blood for lipid estimation (including total cholesterol, HDL, LDL and glucose) should be drawn after fasting—that is, after the applicant has had nothing to eat or drink except water for 12-14 hours. Abstinence from alcohol for several days prior to the test may lower triglycerides levels. Dietary changes in the few days before testing have little effect on lipid levels.

Medical Certification of Persons Affected by Hyperlipidaemia

- Persons with elevated cholesterol/triglyceride levels controlled by dietary means and/or nutritional supplements are not of medical concern to CASA.
- CASA is primarily concerned over the potential for lipid lowering drugs to cause side effects of aeromedical significance. CASA will certificate pilots (both Class 1 and 2) or ATCs taking any of the lipid lowering drugs currently available on prescription in Australia, provided the applicant tolerates the medication well and experiences no significant adverse side effects. A minimum of one month of ground testing is required before the applicant returns to flying/controlling duties.
- Lipid estimation is part of CASA’s cardiovascular risk management program. Should a Class 1 or Class 3 medical certificate holder be found to have an annual risk of cardiovascular event greater than 1% (currently a score of 15 or more points on CASA’s cardiovascular risk assessment tool), he/she will be required to undergo a stress ECG per CASA protocol.
2.4.11 Obesity

Obesity, defined for CASA’s purposes as a BMI >35, is of medical concern because:

- It is an independent risk factor for the development of vascular disease
- The physical dimensions of the obese person may reduce a pilot’s ability to manipulate an aircraft’s controls safely, or to escape in the event of an accident or incident.

**Investigation**

Applicants who have a BMI >35 must be assessed by a DAME, who is to seek evidence of other pathology secondary to the obesity. Obese pilots will be required to demonstrate their ability to control an aircraft safely and to escape in the event of an emergency as part of their certification assessment. This may involve undertaking a CASA directed operational flight/ground check.

**Medical Certification of Obese Applicants**

Obesity per se is only of concern to CASA from an air safety perspective if an applicant suffers from another aeromedically significant disease or condition secondary to the obesity or his/her physical dimensions affect the safe exercise of the privileges of a licence. Such applicants will be assessed on a case-by-case basis. Obese applicants who are otherwise well and can exercise the privileges of a licence safely will be certificated without restriction.

2.4.12 Anorexia

Adult applicants with a BMI <18.5 may suffer from an eating disorder. Prior to certification, a DAME should assess them to exclude such disorders. See section 2.6 Psychiatry.

2.4.13 Appetite Suppressants

CASA will not authorise pilots to fly or ATCs to perform ATC duties when taking any appetite suppressant medication.
2.5 Neurology

2.5.1 Introduction

This section on neurological disorders outlines some of the major categories of neurological diseases that are commonly encountered and indicates their aviation medical significance.

2.5.2 Nervous System Standard – CASR Part 67

The nervous system standards are found in the following paragraphs of CASR Part 67:

- CASR 67.150 For medical standard 1
  - Table 67.150
    - 1.7 – 1.8
- CASR 67.155 For medical standard 2
  - Table 67.155
    - 2.7 – 2.8
- CASR 67.160 For medical standard 3
  - Table 67.160
    - 3.7 – 3.8
2.5 Neurology

2.5.3 Headache

Nearly all applicants have experienced headache. The diagnosis of primary headaches are not discrete and the different types should be considered to be part of a continuous spectrum ranging from Muscular Tension Headache at one end to Classical Migraine at the other. Secondary headaches from other conditions eg, Cranial Neuralgia, Temporal Arteritis should be considered separately.

When considering primary headaches it is important to assess the history according to:

- **Speed of onset**: Is there warning eg, aura or no warning?
- **Period of prodrome**: seconds, minutes or hours?
- **Frequency**: isolated or recurrent, if recurrent how often. Time off work is a useful guide.
- **Neurological symptoms**: aura (crippling or just perceived), photophobia, visual changes, paraesthesia, paralysis, dysphasia etc.
- **Severity**: need for acute and intensive intervention such as parenteral opiate analgesics, degree of incapacitation such as need for bed rest vs ability to continue complex tasks.
- **Treatments and their effectiveness**: How effective prophylaxis if used. Type of acute treatment used eg, Tryptins and speed of response and any significant side effects.
- **Precipitating factors**: such as diet, oral contraceptive etc and effect of avoidance or withdrawal of such factors.

Since objective investigations will most usually negative, a detailed history is essential. The best history is obtained at first presentation.

**Migraine**

For strict diagnostic purposes, migraine is an acute but reversible transient cerebral vascular insufficiency phenomenon and headache is not necessary the most important component. When the vascular insufficiency effect predominates it should be distinguished from transient ischaemic attacks. In the worst case migrainous stroke can occur where the implication for flight duties is similar to that for stroke.

Beware of Atypical Migraine without headaches.

In common usage, the term migraine may refer to any headache, but there are two main types — common migraine and classical migraine.
Common Migraine (Migraine without Aura)

More than 80% of migraine sufferers experience "common" or "non-classical" migraine, which is not associated with sharply defined neurological disturbances.

It is often a label used for Tension Headache perceived to be of significant severity by the patient. Careful history will avoid the diagnosis of migraine with its implication vs. Tension Headaches

Diagnosis of "nonclassical" migraine depends on:

- Detailed history of headaches
- Usually an absence of significant neurological symptoms.

Treatment usually does not include parenteral opiates or specific migraine drugs such as vascular active agents.

Classical Migraine

Classical migraine is accompanied by any transient focal neurological and/or vascular phenomena that may include:

- Unilateral headache
- Hemiparesthesia, Hemiplegia
- Retinal/Occipital phenomena, such as visual disturbance of various degree and scotomata
- Basilar artery phenomena
- Autonomic symptoms of nausea, vomiting etc.

Such migraines have variable periods of remission and rate of onset, and may completely incapacitate the sufferer. There is no universal exclusion of medication. Significant side effect should be explored and their presence or absence documented.

Adverse factors for aeromedical certification include:

- Sudden significant neurological symptom such as loss of vision, weakness and incoordination with no warning
- Failure or of prophylactic treatment with frequent attacks
- Requirement for intensive treatment
- Short prodrome that does not allow effective use of acute treatment before symptom onset.

The Aviation Medicine Section considers all cases individually.
Cluster Headache

Cluster headache is a subgroup of vascular headaches where the frequency of occurrence has a characteristic “cluster” nature. Aeromedical certification assessment considerations are similar to those for migraine. The details of history required are the same.

Other Types of Headache

Tension (Muscle Contraction) Headache

This category of headache can assume the nature of a vascular headache with a pulsating quality when it is severe and is often confused with migraine.

It includes headaches occurring secondary to other conditions that gave rise to muscular tension, e.g. eyestrain, cervical pathologies, psychiatric conditions in which management of the underlying cause is of prime importance.

Chronic tension headaches that require treatment such as anxiolytics or other drugs likely to cause a decreased state of alertness or diminished performance require specialised assessment.

Cranial Nerve Headache

The commonest of these conditions is trigeminal neuralgia. This may be idiopathic or secondary to underlying disease. Irritation of the nerve may be relieved by surgical intervention, which requires specialised neurosurgical assessment. Consideration must be given to the risk and implication for certification associated with any neurosurgery. The side effects of medications commonly used in its treatment include diminished judgement and diminished depth perception. Relevant history should be elicited and documented.

The Aviation Medicine Section assesses all cases individually.

Local Cranial Disease

Temporal arteritis

This condition need not be disqualifying if controlled, particularly when steroid therapy has been ceased. Full specialist reports are required for assessment.

Adverse factors associated with it include loss of vision and intracerebral involvement with significant functional sequelae.

The Aviation Medicine Section assesses all cases individually.
2.5.4 Blackouts, Loss of Consciousness and Syncope

These words are often used interchangeably by both laymen and medical professionals. A detailed description is more informative than the label. It does not necessary describe loss of consciousness (LOC) but can be used to mean an altered state of consciousness, vertigo or even psychiatric disturbance such as fugue-like states. Causes can be primarily neurological, secondary to cardiovascular pathology, gastrointestinal upset, physiological or even be specific to aviation causes such as G induced loss of consciousness.

History of the event is paramount in differentiation of the causes. The applicant should be directed to relive the experience in his/her own words, without prompting. Only when that is established should more direct questions about the circumstances before, during and after the event be asked. The patient's account of sensations should be elicited. Observer history should be obtained if available. If uncertainty exists, record the uncertainty rather than introduce attempts at explanation. Such factual records allow further independent evaluation where necessary. The value and accuracy of the history deteriorates with time and repetition of recounting.

Specific features that will help in differentiating the physiological system involved are:

- **Prodrome**: absence or present.
- **Posture at the time of the episode**.
- **Period**: ie, duration of attack.
- **Postictal orientation**.
- **Activity before, immediately and within 24 hr preceding**.
- **Head trauma**.
- **Frequency**.
- **Urinary incontinence**.
- **Tongue biting**.
- **Observer report**: confirmation of patient’s account, particularly concerning convulsive movements. Time course to any convulsive movement is important ie, did it occur at the same time as LOC, or seconds later?
- **Bystanders’ action**: eg, promptly placing patient in prone or coma position, or keeping patient sitting/upright.
- **Family and/or past history**.
- **Known cardiovascular history or risks**.
- **History of infection such as recent viral infection that may support labyrinthitis**.
Depending on the historical features elicited, the need for referral to relevant specialist/s can be determined. If the cause is primarily neurological, refer to neurologist or neurosurgeon for clarification. For possible cardiovascular causes, cardiologist opinion should be sought. Where the history suggests vestibular problem, ENT opinion will be appropriate.

The Aviation Medicine Section assesses all cases individually.

**Concussion**

The term should be restricted to brief LOC in the setting of blunt head injury with no demonstrable intracranial injury. The emphasis is on the brief duration, which should be in the order of 5 minutes or less. If the event accords with these criteria and no sequelae are reported, it is generally of no significance for aeromedical certification. An exception is made for repeated concussions such as occur in boxers.

**Transient Global Amnesia (TGA)**

The cause of TGA is uncertain. It may be first warning of TIA. Current theory considers it to be a transient, migraine-type of vascular phenomenon. The condition should be distinguished from epilepsy, particularly complex partial epilepsy and symptomatic intracranial tumours.

Relapse can occur and may be precipitated by exercise, coitus, or exposure to water. A period of observation is necessary to monitor relapses. Risk of relapse is 30% and can recur once or twice. Where frequent attacks are present, other diagnoses should be considered.

The condition is benign and affected applicants can be aeromedically certificated following a suitable period of observation. Neurological reports are required in all cases and follow up reviews may be necessary.
2.5.5 Disorders of Equilibrium

**Benign Positional Vertigo**

This is a true rotational sensation accompanied by nystagmus, occurring only on change of head position. It is usually idiopathic or secondary to head trauma. Its course is variable. Assessment is based on the frequency of occurrences, their duration and severity.

**Acute Peripheral Vestibulopathy (Vestibular Neuronitis and Acute Labyrinthitis)**

Diagnosis implies temporary unfitness to fly. If the condition settles without recurrence, a return to unrestricted flying may be permitted after three months.

**Menière's Disease and Acute Recurrent Positional Vestibulopathy (ARPV)**

In these conditions, vertigo usually lasts for hours and often causes chronic disequilibrium. Menière's disease and ARPV have high recurrence rates. Applicants with these conditions are usually unable to meet the standard for certification, but require individual assessment.

**Alternobaric Vertigo**

In this condition, vertigo occurs on change of air pressure, often after a forceful Valsava manoeuvre to clear the ears. Oscillopsia and nystagmus may accompany it.

Occasionally this condition is due to chronic eustachian tube compression (e.g. by hypertrophied adenoids) and may thus be surgically correctable. Recurrent cases are assessed individually.

**Momentary Vertigo**

This is generally considered to be benign unless there is evidence that it significantly affects the applicant.

**Non-Functioning/Hypo-Functioning Labyrinths**

This condition is characterised by unsteadiness of gait, by loss of orientation (particularly in the dark) and by inability to maintain accurate visual fixation while in motion. It is often secondary to aminoglycoside administration. The degree of functional impairment should be fully investigated for decision by the Aviation Medicine Section.
Vestibular Imbalance

Applicants with this condition may experience feelings of unsteadiness on rapid change of position. It is generally benign and a "pass" assessment may be issued.

Multisensory Dizziness

This is a chronic condition of loss of balance or feeling of light-headedness in persons with multiple sensory disorders, such as a combination of two or more of:

- Peripheral neuropathy
- Vestibular imbalance
- Visual impairment
- Cervical spondylosis, and
- Hearing loss.

Multi-sensory dizziness is assessed according to the degree of disability present.

Note: Drugs used to control dizziness and vertigo often produce drowsiness. Control of these symptoms by drugs with such side effects is not acceptable for pilot or ATC medical certification. See also Section 2.13 Medication – Drugs and Flying/Controlling
2.5.6 Seizure Disorders

**General**

The tendency towards epileptic seizures is not an “all or nothing” phenomenon. Most people, under certain conditions, may have a seizure if sleep deprived or withdrawing from alcohol or benzodiazepines, especially if in addition they are taking medications that decrease the seizure threshold (e.g. tricyclic antidepressants). Approximately 2% of the population have a seizure during their lifetimes.

Following a single seizure, an adult has a 30-40% chance of recurrence. Those with a distinct epileptiform abnormality on the EEG, in the setting of a history of seizure, as opposed to non-specific abnormalities, have an increased risk of further seizures.

**Diagnosis**

It is imperative that there be an accurate diagnosis of the type of seizure. The importance of a description of the event cannot be overemphasised. While a useful diagnostic tool, any EEG must be reviewed by an experienced reader and must be evaluated in the context of the clinical history. It is not a useful sole diagnostic or screening tool.

The important components to the diagnosis are:

- More than one event, except Post Traumatic Epilepsy (PTE) for which one event will establish the diagnosis
- Must be unprovoked.

Video-EEG confirms the diagnosis but is not easily available as it is time consuming and difficult to organise except in academic research facilities.

**Aeromedical certification considerations**

A detailed history and specialist neurologist opinion is essential. Provoking factors must be considered. Their absence suggests a poor prognosis.

Significant adverse factors are:

- Unavoidable concomitants of aviation eg, strobe lights, propeller flicker, fatigue
- Difficult to avoid eg, menstruation.

Provoking factors that are avoidable or insignificant in context of aviation are:

- Alcohol excess and/or withdrawal
- sleep.
These should be considered with regards to risk of occurrence in the absence of such factors.

Individuals with established epilepsy, ie, more than one unprovoked attacks, are unfit for aviation medical certification. Persons who have experienced seizures but who are not diagnosed as epileptic may be deemed to meet the medical standard.

**Partial (Simple or Complex) Seizures without progression to Generalise Seizures**

The term Partial Seizure often misleads patients to consider the condition is not as significant as the classical Grand Mal Seizure. Careful counselling of patients should include the explanation that such terms are anatomical and electro-physiological distinctions. The functional effect of impaired conscious state and/or brain activity is equally as significant as in other epilepsy.

**Sleep (Nocturnal) Epilepsy**

Epilepsy that occurs only when asleep is distinguished from sleep disorders such as Sleep Behaviour Disorder, Sleep Apnoea etc. Such disorders must be excluded. Sleep EEG recordings—best with video recording (if possible), will confirm the diagnosis.

The condition is associated with increased risk of seizure when awake ie, progression to the more “classical” type of epilepsy. This risk is increased when the condition is untreated.

Since aircrew and air traffic controllers are not performing flight-related duties when asleep, sleep as a provoking factor is not relevant in the aviation context. When the condition responds to anticonvulsants, the risk of such a seizure during flight related duties is further reduced.

Prior to certification, the effect of anticonvulsant control failure or “breakthrough” must be considered. Expert neurological opinion should be sought to determine if such a control failure occurs. The first presentation may be recurrence of sleep epilepsy or epileptic seizure whilst awake. Recurrence that first presents as fits whilst awake poses a flight safety hazard.

Aviation Medicine Section assesses all cases individually.

Important indicators of less risk are:

- No further occurrence of sleep epilepsy
- Absence of significant side effects of anticonvulsant.
Childhood Seizures

Childhood febrile seizures that are brief, not associated with neurological deficits and have ceased before the age of five are not generally disqualifying. The applicant must have been off all anti-epileptic medications for at least five years and the off-medication EEG, should be normal.

The seizures of Benign Rolandic Epilepsy of Childhood usually involve the face, tongue or hand and are often precipitated by drowsiness or sleep. The EEG shows significant abnormalities from the Rolandoic area. Individuals with this condition may be considered for certification if they have been seizure free and off medication for ten years. They must have a normal neurological examination and EEG. A sleep deprived EEG should also be obtained and must be normal prior to issue of any aviation medical certificate.

Petit Mal or Juvenile Myoclonic Epilepsy is seizure disorders that occur in childhood. Because such conditions may persist into or present during adulthood, they are considered as subtypes of epilepsy. These conditions are associated with a risk of progression to generalised convulsions.

The Single Epileptiform Seizure

Extreme care must be taken to diagnose epileptic seizure in the presence of a single event. Clonic movements from transient brain hypoxia or from other causes are often reported as seizures. The condition should be considered as Loss of Consciousness (see above section on Blackouts, Loss of Consciousness and Syncope). Non-epileptic causes should be sought and excluded.

An individual with a single epileptiform seizure is initially unfit for medical certification. A case may be reconsidered five years from a seizure if the following conditions are met:

- Specialist neurological examination is normal
- Repeated EEGs, including sleep-deprived EEGs, do not reveal any significant abnormalities
- Studies incorporating additional nasopharyngeal or minisphenoidal electrodes, if relevant, do not reveal any significant abnormalities
- Neuro imaging, preferably by MRI, has demonstrated normal brain structure.

For continued medical certification five years after initial certification or recertification, all of the above investigations must be repeated and reported as normal. Applicants for Class 1 certification may be restricted to "as or with co-pilot" for a further two years. Individuals who have a second seizure are considered to have epilepsy.
When a single seizure was related to alcohol withdrawal, applicants may be considered for medical certification earlier if they have a normal EEG and Neuro imaging, and psychosocial and biochemical evidence is presented that their alcohol abuse is in a continuing "recovery" phase. The alcohol abuse should be dealt with as a separate medical problem.

Those who have had a seizure while on tricyclic antidepressant drugs or other seizure enhancing medications should be considered more prone to seizures than the average population. Both neurological and psychiatric opinions should be sought to manage their interrelated problems. Psychiatric report should indicate the optimum treatment required and if alternative treatment is suitable and/or available. The neurological report should indicate the applicant's risk of further seizures, particularly if using other psychotropic medication for psychiatric treatment.
2.5.7  Head Injuries

There are two major concerns over fitness for aviation-related duties following head trauma. One is the neuropsychological consequence of the trauma in applicants who have not had any clear focal deficits and the other is the possibility of Post Traumatic Epilepsy (PTE).

The neuropsychological consequences are secondary to the effects of acceleration/deceleration forces on the skull and brain. Because of the anatomy involved, these forces cause their greatest focal damage to the orbital, frontal and anterior temporal areas of the brain. Diffuse white matter damage may be associated with the cortical damage.

The result of such injury is dysfunction in a number of functional executive activities of the brain. Frequent effects include:

- Slowing of reaction time, impaired memory and decreased ability to maintain a high level of performance over time, particularly in settings of complex activities and choices,
- A high propensity for further mental decline with fatigue, and
- Other problems include maintaining attention, initiation and proper sequencing of tasks, difficulty in planning and anticipating, and difficulty in establishing automatic responses to a trigger.

The affected individual may not notice or care that the task is being poorly performed. Stress, fatigue and pain may exacerbate all these effects, and the handling of simultaneous emergency tasks is particularly affected.

Although the effects of head trauma may be severe, routine IQ and mental status testing may be within normal limits. Fortunately there is a natural tendency for neurological deficits to improve with the passage of time. There are a number of ways to predict the outcome of a head injury. The most commonly used is the duration of post-traumatic amnesia (PTA). Serial sequential neuropsychological tests separated by months or years can document changes associated with improvement of neurological deficit. A pre-trauma baseline test of such nature will provide the ideal reference but is not usually available. The limitations of neuropsychological testing should be recognised eg, learning; subjective interpretations by the tester, interface issues (particularly if computer-based) and its results should be interpreted with these limitations in mind.
2.5 Neurology

Mild Brain Injury

This is characterised by:

- Transient loss or alteration of consciousness without any focal neurological deficit and with rapid return to alertness and orientation
- Post-traumatic amnesia (PTA), which occurs when a person is conscious but ongoing events are not recorded in the memory. The duration of this lapse must be less than one hour; and
- Post-traumatic syndrome (PTS) which comprises a symptom complex involving:
  - Dizziness
  - Emotional impairment
  - Intellectual impairment, and
  - Headache.

Applicants with mild brain injury are generally considered to be fit to fly unless there is a history of PTS, which takes more than six months to resolve.

Any alteration of consciousness associated with head trauma is a sufficient indicator of likely brain injury that flying should not be undertaken for at least two weeks — the period during which "early" post traumatic epilepsy is most likely to occur.

Even in the absence of other risk markers or of a neurological deficit, a more prolonged loss of consciousness and its associated post-traumatic amnesia should be followed by longer periods of suspension from aviation related duties, as follows:

<table>
<thead>
<tr>
<th>PTA Duration</th>
<th>Duration</th>
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<tr>
<td>&lt; 1 HR</td>
<td>1 month</td>
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<tr>
<td>1 HR - 24 HRS</td>
<td>3 months</td>
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<td>&gt; 24 HRS</td>
<td>At least 1 year</td>
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In all cases, formal confirmation of neurological fitness should precede a return to flying and referral to the Aviation Medicine Section for a final decision is required.

Moderate and Severe Brain Injury

The significant factors in the assessment of head injuries, which produce moderate or severe brain injury, are:

- Extent and nature of any neurological deficit
- Risk of post-traumatic epilepsy (PTE).
2.5.8 Post-Traumatic Epilepsy Markers

A past history of febrile convulsions in childhood and/or a family history of epilepsy doubles the risk associated with any other markers.

Early post-traumatic epilepsy that occurs within the first week following injury carries a 25% risk of later epilepsy. Convulsive movements that accompany an impact head injury do not increase this risk. However, any convulsive activity following the immediate effects of impact, however shortly thereafter these occur, should be considered as "early post-traumatic epilepsy".

Demonstrated haemorrhage within the brain substance, particularly the cortical part, is associated with 25-45% risk of PTE. Depressed fractures or presence of blood in the subarachnoid space are not reliable guides to risk of PTE. However, the presence of such findings should alert investigators to search for bleeding within the brain substance.

Both CT scan and MRI are desirable in assessment of such bleeding. Availability dictates which test is performed. MRI has the advantage of being able to grade breakdown products from blood and can be very sensitive for late imaging where no initial CT or MRI was performed. Where possible an initial CT and/or MRI should be performed. If the history suggests a severe head injury and no initial imaging available a MRI should be performed to detect residual changes associated with bleeding within the brain substance.

A normal MRI should be reassuring.

Other markers are the presence or absence of a post-traumatic amnesic interval of more than twenty-four hours, focal signs, and early post-traumatic epilepsy.

Once the first post-traumatic week (the period of early PTE) has passed, the risk of subsequent PTE decays exponentially. By two years, the residual risk is less than 20% of that immediately post-injury and at four years it is less than 10% of that initially present.

When considering recertification, a residual risk of PTE of 1% or less is acceptable, given that the prevalence of epilepsy in the community is 0.33%.

Conditions that require careful assessment and which most commonly result in a "fail" assessment are: epilepsy, intracerebral haematoma, persisting CSF fistula, primary open cerebral laceration, and the presence of any significant permanent neurological deficit.
Recertification Guidelines

The Aviation Medicine Section applies the following guidelines:

1. Applicants with PTA lasting 30 minutes or less, who after the event have a normal neurological examination and no sequelae, may return to full duties in three to four months if the CT scan is normal.

2. Applicants with PTA from 30 minutes to 24 hours, with a normal MRI and EEG, are acceptable after 12 months. If a seizure occurred in the first week after trauma in an adult, a longer interval before re-licensing is required. Such cases are assessed individually.

3. If there is PTA greater than 24 hours, but Neuro imaging and neuropsychological testing are normal, applicants can be declared fit after two years. Flight simulator testing may provide additional valuable information in these cases.

4. Applicants with head injuries associated with intracerebral haemorrhage or focal deficit, whose neuropsychological testing does not show significant sequelae at 5-7 years post trauma, may return to duties after 7 years. Those who demonstrate abnormal neuropsychological sequelae have been more seriously injured and are considered individually. MRI is essential to determine presence or absence of bleeding.

5. Use of an anticonvulsant may mask the presentation of any PTE. The duration of the seizure free period should be considered as beginning only when applicant is off anticonvulsant medication. Where the risk of further seizures is considered to be too high to cease medication, the applicant is not medically fit for certification.

2.5.9 Neurosurgery

Opening the skull is not necessarily a permanently disqualifying factor for flight crew or ATC certification.

Assessment is based on:

- The underlying disease and its prognosis
- Any neurological deficit
- Surgical approach and any associated induced injury to the brain substance along the approach path
- Any risk of post operative epilepsy secondary to destruction or removal of cerebral tissue
- Location of the supratentorial/infratentorial lesion.

Full reports are required in all cases. DAMEs should issue a "doubtful" assessment and provide explanatory notes.
2.5.10 Cerebrovascular Diseases

These pathologies are usually secondary to or associated with other medical conditions and these should be sought and controlled besides dealing with the presenting cerebrovascular events. Investigations are more informative regarding the causes than the history alone. Imaging by CT scan, MRI or Angiography will differentiate the various types. Other investigations such as lipid profile, stress test for coronary ischaemia, ultrasound of carotid and heart, digital subtraction angiography etc should be considered to address non-cerebral conditions. The treatment of these non-cerebral pathologies may introduce factors affecting aeromedical certification, eg, use of an anticoagulant.

Specialist neurologist assessment is mandatory. Opinion should specifically include the risk of:

- recurrence
- epilepsy
- subtle or acute incapacitation.

Such assessment should be supported by reference to current literature with reasoned opinions.

Where subtle functional changes are suspected, neuropsychological testing to quantify the changes should be undertaken. These tests can be expensive and are open to varying interpretations.

**Ischaemia**

Assessment of transient ischaemic attacks (TIAs) and reversible ischaemic neurological deficits (RINDs) depend upon their causes.

- **Stenosis.** Although stenotic lesions may be bypassed or treated by endarterectomy, the risk of continuing TIAs and cerebral infarction remains high.
- **Embolism.** The risk of recurrent embolism or of haemorrhage secondary to anticoagulation is high.
- **Postural.** Individual assessment is required, but most instances are related to head movements necessary for flying.
- **Vascular headache.** See earlier section on Headache.
- **Blood hyperviscosity.** This condition may be due to polycythaemia, myelomatosis, Waldenstrom's macroglobulinaemia, etc. These cases are assessed individually and usually result in "fail" assessments if the hyperviscosity cannot be controlled.
- **Hypertension.** If adequate control is established with the use of suitable drugs, these applicants may be considered fit.
All precipitating or associated pathologies should be addressed and separate reports relevant to them included.

Aviation Medicine Section assesses all cases individually.

**Haemorrhage**

There are two major types of cerebral bleeding:
- Intracerebral haemorrhage, producing cerebral infarction
- Subarachnoid haemorrhage.

Most cases are secondary to leakage or rupture of an aneurysm; some are secondary to arterio-venous malformation. Surgery to treat them may cause injury to brain matter with associated post-operative epileptic risk. Details of the surgery should be included in reports.

20% have no identifiable cause but may be related to sustained hypertension or to transient elevation of blood pressure.

All affected patients are at risk of later developing normal pressure hydrocephalus with visual field loss and corresponding subtle incapacitation. This possible complication should be looked for and excluded as part of the follow up of all affected applicants.

Aviation Medicine Section assesses all cases individually.

**Cerebral Infarction**

Applicants who have suffered a cerebral infarct are generally considered unfit for at least one year. Recertification depends on:
- Underlying pathology leading to the stroke
- Absence of neurological deficit
- Risk of recurrence
- Assessed risk of future seizures.
2.5.11 Infections of Central Nervous System

**Meningitis**

All applicants diagnosed with meningitis should not engage in flight duties for six months. Return to flight duties depends on the nature of the infecting agent or cause of meningitis, eg, viral, bacterial or fungal, and the degree of recovery of resultant deficit and risk of development of epilepsy or hydrocephalus.

**Encephalitis**

This is dealt with as for meningitis.

**Brain Abscess**

Assessment is based on the underlying cause and whether the lesion is:

- Supratentorial, in which case the risk of epilepsy and the degree of deficit must be considered, or
- Infratentorial, where the nature and degree of deficit must be considered.
2.5.12 Degenerative Disease

**Dementia**

Dementia is defined as deterioration in cognitive abilities that impair the previously successful performance of activities of daily living. The examining doctor is in a better position to assess an applicant with possible dementia if there has been contact over some years and changes over time can be more readily appreciated.

Memory loss, particularly short term, is most common and tends to affect executive function. (Planning, initiation and regulating behaviour for systematic, goal-directed activity. It is highly involved in novel situations where long term memory “experience” is not adequate).

In the aviation medical examination, presentation of dementia tends to occur at early stage in the process, with consequently difficult diagnosis. Pathologies that cause secondary dementia should be sought and excluded before a diagnosis of primary dementia is made. Age of onset is not a reliable guide. With aging, frequency of all pathology increases. Dementia, primary or secondary, is one of the many manifestations of increasing age. In the absence of pathology, even advanced age is not a reason for refusal of medical certification.

In early dementia, diagnosis usually is made by exclusion. Where a positive finding is present eg, brain atrophy on CT scan, the diagnosis is more likely. However, the absence of such findings does not preclude the diagnosis. Investigations should be guided by pathologies that produce secondary dementia.

Clinical examination can be formal or informal. Abnormal performance of tasks such as form completion, or following simple instruction such as undressing should be recorded. Mini-Mental State Examination has limitations because of its dependence on the applicant’s linguistic ability, educational level and cultural background, particular in the early and late stages of the condition. Other reasons for poor test performance should be carefully considered before the result deemed positive. If test performance is normal, the presence of dementia is unlikely.

The greatest diagnostic challenge occurs where formal tests appear normal yet a family member or the examiner’s prior knowledge of the applicant indicates the presence of changes in mentation sufficient to cause concern. A flight performance report from instructors should be sought. Formal flight test may be necessarily. Assessment of flight performance must take account of the pilot’s experience and currency. Highly experienced pilots may perform adequately even when mildly impaired. Comparison with previous performance or with that of other pilots’ with similar experience should be sought.

Many dementias are progressive but some may be static. Where dementia has been demonstrated to be progressive, an immediate “fail” assessment is likely.
2. Medical Aspects
2.5 Neurology

Note: If dementia is secondary to metabolic disease or correctable organ failure, there may be significant recovery of mental function following effective treatment. Aviation Medicine Section assesses all cases individually.

Normal Pressure Hydrocephalus

Treatment is not effective in preventing progression and subtle incapacitation may develop even in the presence of a working shunt. Assessment will be "fail".

2.5.13 Extrapyramidal Disease

Parkinsonism

This is characterised by:

- Rigidity
- Bradykinesia
- Tremor—although a "resting" tremor eases with movement, stress may produce a "reversal" with worsening of tremor on movement.

Parkinsonism can be a manifestation of other diseases and such causes should be sought and dealt with. Parkinson’s disease is a chronic, progressive disorder of primary Parkinsonism with no evidence of more widespread neurological involvement.

The functional effects of Parkinsonism can be variable. A careful record of neurological deficits, including effect on common activities, should be made. This will serve both as a quantitative appraisal tool and for comparison in evaluating subsequent progression of the condition.

A flight test is an essential component of evaluation. It should be the last of the tests performed and does not replace clinical assessment.

Applicants may be assessed as fit for certification if there is no adverse effect of treatment such as postural hypotension or "on-off" phenomena, and if the following features are adequately controlled:

- Bradykinesia
- Rigidity
- Tremor
- Adjustment of centre of gravity
- Voice quality
- Rapid scan eye movement.
Significant sequelae relevant to aviation safety include:

- Altered colour vision
- Dementia (late phenomenon)
- Depression (early as reaction to diagnosis, or later as a primary phenomenon)
- "On-off" phenomenon: abrupt but transient fluctuation in clinical state within the day, often as complication of levodopa therapy.

Progression to incapacitating symptoms or signs is generally slow. Shortened validity of certification is required to facilitate monitoring of changes. Class 1 certificate holders may require 6-monthly review and restriction to duties ‘as or with co-pilot’. All classes of medical certificate holders will require neurological review at least annually.

Applicants receiving treatment who display "on-off" phenomena will not be certificated to continue flight duties due to the likelihood of rapid onset of incapacitation within the time period of a typical flight.

2.5.14 Demyelinating Disease

**Multiple Sclerosis (MS)**

MS is characterised by multiple episodes of demyelinating attacks within the central nervous system. Diagnosis cannot be made following a single attack unless confirmed by MRI changes. A single attack with a single lesion on MRI does not confirm the diagnosis. Multiple lesions in the clinical setting of single attack may be consistent with the diagnosis.

The course of the disease can be relapsing-remitting or progressive. In the relapsing-remitting type some patients may remain static for many years while some will relapse at variable frequency. Favourable prognostic features are: isolated optic neuritis or other sensory change, complete recovery, age of onset younger than 40 years, female, fewer than two relapses in the first year of illness and minimal impairment five years after the first presentation.

Progressive type of MS has a 50% probability of functional deficit in daily life activities requiring assistance at 10-15 years from initial diagnosis.

Typical attacks in mild cases have onset over days rather than minutes. However in severe cases, attacks can present as an acute neurological event. Seizure is uncommon.
In all cases, assessment depends upon:

- Nature of symptoms
- Time between exacerbations
- Residual deficit
- Likelihood of sudden incapacitation
- Activity of the disease.

A flight test may be necessary to determine the effect of any residual deficit.

All cases of MS require formal neurological opinion. Aviation Medicine Section assesses all cases individually.

Any subsequent certification will require regular specialist reviews.
2.5.15 Intracranial Tumours

(See also Section 2.14 – Malignancy.)

Three factors affect the aeromedical disposition of applicants with intracranial tumours:

- Malignant or benign
- Treatment modality: chemotherapy, radiotherapy, surgery
- Degree of brain involvement.

Certification of applicants with secondary malignant brain tumours is principally a function of the characteristics of the primary tumour.

Certification of applicants with primary malignant brain tumours depends on prognosis in terms of malignancy and sequelae of any treatment received.

Certification of applicants with benign brain tumours depends on tumour size and location and the effect of any treatment.

Radiotherapy

Whole brain irradiation may be associated with late radiation injury effects. Focal irradiation may cause residual changes demonstrated on MRI. Such complications should be monitored for and excluded.

Chemotherapy

Systemic effects have to be considered in any aeromedical assessment.

Surgery

Effects occur regardless of the tumour’s malignancy. For tumours within the brain, aeromedical concerns are for brain substance loss, with associated neurological deficit, and surgically induced bleeding into brain substance, with associated post-“traumatic” epilepsy.

Essential factors for consideration are:

- **Site of tumour**: supra or infratentorial
- Surgical approach
- Details Of The Surgery: amount of intraoperative bleeding, retraction and compression of brain, and any intraoperative difficulties or complications.
The treating neurosurgeon’s report and opinion on the risk of epilepsy is a mandatory requirement for aeromedical assessment and must include:

- Details of any neurological deficit from brain substance loss or as result of surgical approach
- Risk of epilepsy
- Risk of recurrence of tumour.

Benign tumours not involving brain substance such as meningioma or acoustic neuroma should be considered in terms of:

- Treatment used: radiation and/or surgery
- Severity of compression effect on underlying neural structure: brain or nerve. In respect to brain compression, the potential for epilepsy should be considered.

A report from the specialist involved is required in all cases.

The effect of different treatment combinations and their likely sequelae requires expert neurological opinion on the particular therapy.

If there is no significant neurological deficit, these applicants may be assessed as fit for pilot and ATC duties. Applicants with small tumours, with no significant deficit after treatment by cryotherapy, after which there has been no evidence of epilepsy, may be assessed as meeting the required medical standard or as posing no significant risk to the safety of air navigation.

Applicants with history of childhood cerebellar astrocytoma who have been cured and who have no deficit or history of epilepsy may be assessed as meeting the required medical standard or as posing no significant risk to the safety of air navigation.

For adult subtentorial tumours, Aviation Medicine Section assesses all cases individually.

Nasal approach to pituitary tumours has a low risk of sequelae; the primary aeromedical consideration is endocrine effect and any residual compression effect on the optic nerves.

Malignant tumours fully excised, with or without associated radiotherapy, are considered according to their potential for recurrence, effect of the treatment, and their associated seizure risk. Those treated by radiotherapy alone will require long period of observation, usually in order of years, before the condition can be considered cured. Early certification is unlikely.

Applicant with benign tumours treated by radiation alone will be considered individually, dependent on the siting and any residual pressure effects on surrounding structures.

Benign intraventricular tumours will be considered individually, with any neurological deficit resulting from the surgical approach the main consideration.
2.5.16 Extracranial Neurological Disease

**Peripheral Nerve Diseases**

These disorders are assessed on the basis of the nature and degree of deficit. Autonomic involvement may produce syncope and is generally regarded as incapacitating. Full reports are required.
2.6 Psychiatry

2.6.1 Introduction

This section details the assessment procedures for pilots, other aircrew members and air traffic controllers (ATC) who suffer or who may suffer from psychological disorders or psychiatric disease.

The aim of the psychiatric assessment within the aeromedical examination is to ensure that applicants do not suffer from psychological disorders or psychiatric disease which places them at an increased risk of incapacitation, which may produce a decrement in psychological or higher cortical function, or which may jeopardise the safety of air navigation. A particular concern is the potential for an affected individual to commit an unsafe act that impairs the safe operation of an aircraft.

When conducting the aeromedical examination, the DAME should recognise that an individual who holds an unrestricted medical certificate must be capable of safely performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities (either as a private or a professional pilot) may include flight:

- For prolonged duration, often as part of a shift roster
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning
- Subject to disrupted sleep and time zone changes.

A number of these stressors may also affect Air Traffic Controllers.
### 2.6.2 The Psychiatric Standard – CASR Part 67

The psychiatric standards are found in the following paragraphs of CASR Part 67:

<table>
<thead>
<tr>
<th>CASR 67</th>
<th>For medical standard 1</th>
<th>CASR 67.150(7)</th>
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<td>3.4 – 3.6</td>
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<th>For medical standard 2</th>
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<th>For medical standard 3</th>
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2.6.3 Psychiatric Assessment

All applicants for Australian aviation medical certificates are required to complete a comprehensive screening questionnaire, to be physically examined by a DAME, and to undertake a number of screening tests.

When conducting the psychiatric component of the aeromedical examination, the DAME should note the presence of relevant risk factors for the development of psychiatric disease and the presence of signs and symptoms suggestive or diagnostic of such conditions. (A Generic Template for an Aviation Psychiatric History is being developed to guide the conduct of an aviation medical psychiatric assessment and will be provided in due course.)

For example, risk factors for the development of alcoholism include:

- Family history of alcohol abuse
- Family or work stresses
- Financial pressures
- Single marital status.

Psychometric testing may assist in making a psychiatric diagnosis and referral to a consultant psychiatrist may be indicated to confirm a diagnosis or to resolve concern over a differential diagnosis. CASA may require a pilot or an ATC to be assessed by a consultant psychiatrist as part of its consideration of an applicant’s fitness for aeromedical certification.
2.6.4 Documentation of Psychiatric Conditions

Psychiatry is a subjective science. DAMEs need to take a careful and thorough clinical history before reaching a psychiatric diagnosis, particularly a diagnosis that may have significant occupational implications for pilots or ATCs. The Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations is provided to assist DAMEs in taking such a history and to bring consistency to their reporting.

In addition to requiring a traditional narrative report of psychiatric illness in aviators, CASA will henceforth require DAMEs and consultants to classify psychiatric conditions in aircrew and ATCs in accordance with the criteria defined in the Diagnostic and Statistical Manual of the American Psychiatric Association (DSM IV). Use of the DSM system will provide CASA with a tool to ensure the uniform assessment of all aircrew and ATCs diagnosed with psychiatric disease and allow CASA to make an informed assessment of the aeromedical risk posed by a particular applicant with a psychiatric condition.

DSM IV categorises psychiatric disorders and disease along several axes:

- Axis I - Clinical syndromes
- Axis II - Developmental Disorders/Personality Disorders
- Axis III - Physical Disorders and Conditions
- Axis IV - Severity of Psychosocial Stressors
- Axis V - Global Assessment of Function¹.

The first three axes constitute the diagnostic assessment of a patient with a psychiatric condition. Conditions in Axis I (and to a lesser extent Axis II) are those most likely to be of aeromedical concern in the flying safety context. Axis III permits the clinician to indicate any current physical disorder or condition that is potentially relevant to the understanding or management of the case. (These are disorders or conditions listed outside the mental disease section of ICD 10).

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¹ CASA does not require an Axis V assessment. An amended assessment scale for assessing function in Aviators is under consideration.
Axis IV provides a scale for coding the overall severity of the psychosocial stressor(s) acting upon the patient that have occurred in the year preceding the current evaluation and that may have contributed to the development, recurrence or exacerbation of a mental disorder. The rating of severity of the stressor should be based on the clinician’s assessment of the stress an “average” person in similar circumstances and with similar socio-cultural values would experience from the particular stressor(s). Clinicians should also make an assessment as to whether the stressors are acute (less than 6 months) or enduring (greater than 6 months).

Axis V permits the clinician to indicate an overall judgement of a person’s psychological, social and occupational functioning (as an aviator or ATC) on a scale that assesses mental health-illness. Two ratings should be made using this scale; the first an assessment of current function and the second an assessment of best function during the preceding 12 months.

Thus, for example, a DAME reporting on an airman with psychiatric illness may summarise his condition as follows (in addition to providing a narrative of the situation):

Axis I: Major depression: single episode, severe, without psychotic features
       Alcohol dependence
Axis II: Dependent personality disorder
Axis III: Alcoholic cirrhosis of liver
Axis IV: Stressors: anticipated retirement; grounded by company; change of residence; loss of contact with friends
Axis V: (Not required by CASA at present.)
2.6.5 Disorders Diagnosed in Childhood

**Mental Retardation**

This disorder is characterised by significantly sub-average intellectual function with concurrent deficit or impairment in adaptive functioning. Onset is before the age of 18 years. Where the results of standardised, individually administered intelligence tests indicate significant reduction in an applicant’s intellectual performance likely to limit the individual’s ability to control an aircraft and where clinical assessment indicates a deficit in adaptive behaviour, CASA will not issue a medical certificate.

**Learning Disorders**

Learning disorders are diagnosed when an individual’s achievement on individually administered, standardised tests in reading, mathematics or written expression are substantially below that expected for age, schooling and level of intelligence and when such deficits interfere with academic achievement or activities which require such skills. CASA will not issue a medical certificate to an applicant who has a learning disorder that precludes the acquisition of knowledge and information essential to safe flight.

**Motor Skills Disorders**

The essential feature of this group of disorders is a marked impairment in the development of motor coordination sufficient to interfere with academic achievement of activities of daily living. Recognition of this disorder usually occurs in childhood. Clinical course in variable, and in some cases, lack of coordination continues through adolescence into adulthood. In general, CASA will not issue a medical certificate to an applicant who suffers an impairment of motor skill sufficiently severe to threaten the safety of flight.

**Communication Disorders**

CASA will not usually issue a medical certificate to an applicant who suffers a communication disorder severe enough to compromise effective communication in the aviation environment. Practical testing may be required to establish the effectiveness of an applicant’s communication abilities.
Pervasive Development Disorders

These disorders are characterised by severe and pervasive impairment in several areas of development relative to an individual’s developmental level or mental age. Autistic Disorder is the commonest of these disorders. The essential features of an individual with this disorder are impairment in reciprocal social interaction (which is gross and sustained), impairment in communication skills and markedly restricted repertoire of activity and interests. The symptoms and characteristics of autism can present in a wide variety of combinations, from mild to severe.

Other conditions in this group include Rett’s Disorder, Asperger’s Disorder and Childhood Disintegrative Disorder.

Sufferers of disorders in this group will usually be precluded from holding CASA medical certification.

Attention Deficit/Hyperactivity Disorder (ADD/ADHD) and Disruptive Behaviour Disorders

This disorder is amongst the most common neuro-developmental disorders found in children. Its hallmarks are hyperactivity, impulsiveness and inattention beyond the norm for a child’s age. There may be wide variations apparent in the severity of this disorder. Other psychiatric conditions frequently co-exist in children suffering ADD/ADHD. While the diagnosis is reliable if made to the criteria outlined in DSM IV, concerns over the validity of the diagnosis in a particular individual are frequently expressed. Sufferers of ADHD/ADD are significantly more likely to be involved in motor vehicle and industrial accidents (whether on pharmacological treatment or not) than similar groups of individuals who do not suffer from this condition(s).

Aeromedical concerns relate to the capacity of a sufferer of ADD/ADHD to safely control an aircraft and to the potential adverse effects of amphetamine medications frequently utilised to treat this condition. To consider an application for aeromedical certification from a sufferer of ADD/ADHD, CASA requires a thorough assessment of the applicant by a consultant psychiatrist (to confirm the diagnosis against the criteria indicated in DSM IV and exclude other conditions) and the results of neuropsychological testing. Where evidence exists of persisting deficiencies in cognitive ability, behavioural aberrancy or where an applicant requires continued use of amphetamine medication, the applicant will not be aeromedically certificated.

Refer to the Criteria for the Diagnosis of ADD/ADHD.
Conduct Disorder (Antisocial Personality Disorder of Childhood)

The essential feature of conduct disorder is a repetitive and persistent pattern of behaviour in which the basic rights of others or major societal norms or rules are violated. CASA will not usually consider certification for a medical certificate to an applicant with a substantiated history of conduct disorder.

Oppositional Defiant Disorder

The major feature of this condition is a recurrent pattern of negativistic, defiant, disobedient or hostile behaviour towards authority figures that often develops gradually in childhood and may continue into adolescence and even into adulthood. CASA will not usually consider medical certification for an applicant with a substantiated history of oppositional defiant disorder.

Tic Disorders

A tic is a sudden, rapid, recurrent, non-rhythmic, stereotyped motor movement or vocalisation. Tics may be simple or complex, may exist in isolation or be part of a condition such as Tourette’s Syndrome. Where an applicant's tic is believed to have implications for the safety of air navigation, CASA will not issue a medical certificate. Sufferers of Tourette’s Syndrome will usually be precluded from holding medical certification.
2.6.6 Delirium and Dementia

**Delirium**

Delirium is a disturbance of consciousness, accompanied by a change in cognition that is not due to pre-existing or evolving dementia. The disturbance generally develops over a short period, and often fluctuates during the course of a day. There is generally evidence from the clinical assessment of the aetiology of the delirium which may be due to a general medical condition, substance intoxication/withdrawal, use of medication, toxin exposure or a combination of these factors.

Aviators and ATCs with acute delirium should immediately be stood down/stand down from flying or controlling duty. CASA will only consider aeromedical certification once the applicant has recovered from the delirious state, and the underlying cause of the delirium has been identified and remedied.

**Dementia**

Dementias are characterised by the development of multiple cognitive deficits (including memory impairment and one or more of the following cognitive disturbances: aphasia, apraxia, agnosia, or a disturbance of executive functioning). While dementias share a common symptom presentation they may be differentiated on the basis of aetiology.

It may be difficult to make a diagnosis of early dementia in an individual who has enjoyed a well paid and responsible position in the aviation community for many years, but who is finding it impossible to learn new skills and to retain them (e.g. changing aircraft type). Anxiety or mood disorders may co-exist. Sympathetic handling and possibly psychological evaluation may prove helpful and the latter may be necessary to exclude or establish a diagnosis of pre-senile dementia. In such cases the decision about medical certificate revalidation will need to be based upon a very careful evaluation of all clinical and occupational information.

Once an applicant demonstrates a significant impairment of memory and other cognition, he/she should refrain from exercising the privileges of the pilot or ATC licence. CASA will not usually issue an aviation medical certificate to a sufferer of dementia.
2.6.7 Mental Disorders due to medical conditions not classified elsewhere

Reserved.

2.6.8 Substance Related Disorders

This group of disorders includes disorders related to the problematic use of a drug, including non-prescription medications, prescribed medications and drugs of abuse (e.g. alcohol, cocaine), other substances (e.g. volatile solvents) and to toxin exposure. For CASA purposes, this classification does not include nicotine abuse disorder. Some prescription drugs, whilst legally prescribable, are inappropriate when used by pilots or ATCs in the aviation environment (e.g. MS Contin). The safety of medications is dealt with in Section 2.13 Medication – Drugs and Flying/Controlling. The substance related disorders are divided into two major categories: the substance use disorders (abuse and dependence) and the substance induced disorders (substance induced intoxication, withdrawal, delirium, dementia, amnesia, psychosis, anxiety, mood, sexual dysfunction and sleep disorders). CASA will not usually issue an aviation medical certificate to a pilot or ATC who suffers a substance abuse disorder or who is involved in the problematic use of drugs.

Drug Testing

Current CASA practice is to ask all applicants for aeromedical certification (original and renewal), about possible problematic use of drugs and substances. DAMEs should also look for evidence of drug or substance use/abuse in their assessment of applicants.

Applicants who admit to the problematic use of drugs/substances or whom the DAME suspects of drug/substance abuse on the basis of other history or examination findings are required to submit a urine sample for drug screening. Urine samples for drug testing purposes should be provided as part of and at the time of the DAME medical certificate examination and should be passed under the direct supervision of the DAME. The sample should then be split into two clean containers and each sealed, the applicant being offered his/her choice of samples for independent testing. The other sample is to be forwarded to the testing pathology laboratory by the DAME. (Under no circumstances is this sample to be given to the applicant). Urine drug testing required by CASA is to be undertaken at the applicant's expense.

As a minimum, urine samples should be tested for the following groups of drugs: cannabinoids, amphetamines, cocaine analogues, hallucinogens, opiates, sedatives and phencyclidine analogues. In addition, the requesting DAME should request testing for any other drug/substance that he/she suspects that the applicant may be using/abusing.

Any applicant who returns a positive urine drug screen and thus confirms his/her problematic use of drugs/substances does not meet the relevant medical standard. CASA will not issue a medical certificate unless an explanation acceptable to CASA is provided.
Alcohol Abuse/Alcoholism

A number of alcohol related syndromes are described:

- **Acute intoxication** with alcohol is a concern in the aviation workplace by virtue of the way in which it impairs psychomotor performance that may potentially lead to accidents and injury. The potential for catastrophic outcomes in the aviation environment arguably render it impossible to consider any episode of acute intoxication in a pilot on duty as “uncomplicated”. Current CARs provide specific requirements on “bottle to throttle time” for pilots and ATCS and it is intended that the new CASRs, when published, will limit the blood alcohol concentration of pilots and ATCs.

- **Harmful use of alcohol** is associated with damage to the physical or mental health of the individual; in the absence of a diagnosis of the alcohol dependence syndrome. Certain specific and severe consequences of alcohol misuse may also be diagnosed separately – notably alcoholic hallucinosis, Korsakoff’s psychosis and alcoholic dementia.

- The **alcohol dependence syndrome** is a cluster of biological, psychological and social phenomena that may be diagnosed where three or more of the following features are identified during the preceding year:
  - A strong desire/compulsion to drink
  - Difficulties in controlling drinking
  - A physiological withdrawal syndrome associated with abstinence
  - Increased tolerance to alcohol
  - Neglect of other activities due to drinking
  - Persistence of drinking despite harmful consequences.

- **Alcohol withdrawal** is associated with mild to severe symptoms, including sweating, nausea, tremor and anxiety. However, it may be associated with serious complications, including convulsions or delirium (“delirium tremens”).

- An isolated **drink driving offence** does not fulfil ICD-10 criteria for harmful use of alcohol (although it does fulfil DSM-IV criteria for alcohol abuse) and CASA will generally not take action in response to a single episode of PCA. However, such offences do indicate an increased probability that other alcohol related problems might be identified, and this probability increases still further where there have been multiple drink-driving offences committed.

**Note:** The FAA prohibits the medical certification of pilots who are convicted of two or more drink-driving offences within a 3-year period.
Medical Assessment

The experience of certain major airlines and licensing authorities is that success in rehabilitation of the alcohol dependent pilot can best be achieved by early intervention and treatment, adhering to the strict protocol outlined below. By using this program it has been possible to return aircrew to active flying within four months.

- **Immediate action.** A pilot or air traffic controller must be assessed as temporarily unfit on reasonable suspicion of:
  - intoxication whilst on duty
  - harmful use of alcohol
  - alcohol dependence
  - other alcohol related problems.

Such an assessment may be taken by the airline’s own medical officer, by the DAME or by CASA, or by a member of flight crew or operations staff.

Where a pilot is thought to be intoxicated whilst on duty, particular care and sensitivity are required and the specific action taken may depend, in part, upon the company drug and alcohol policy. However, where possible, it is important to obtain an objective assessment of the alleged intoxication at the earliest opportunity. This might involve use of a breath alcoholmeter, a blood alcohol analysis or urinary drug testing. Such procedures may only be conducted with the patient’s consent. Given that blood alcohol concentration falls fairly rapidly with abstinence, such testing should be conducted as soon as possible. Refusal of testing, and any reasons given for this, should also be recorded carefully. A period of less than 4 hours between detection and testing is considered usual.

- **Treatment and rehabilitation.** If psychiatric opinion and examination confirm “alcohol abuse with or without dependency”, then a residential in-patient program is a mandatory requirement if revalidation is to be considered. The treatment program undertaken should be directed by the treating psychiatrist and may or may not include pharmacotherapy.

Where the diagnosis is considered not to constitute “alcohol abuse with or without dependency” but where there is still a degree of concern regarding an alcohol related matter, then a less intensive treatment may be indicated. For example, such treatment may comprise a day-patient program, or outpatient counselling. The circumstances in which this may be offered must be a matter of judgement. (Arguably, heavy drinking as a cause of an elevated GGT or hypertension, but without any other complications or problems, might be an example of such circumstances.)
Follow-up and monitoring. DAMEs or CASA should be advised as soon as treatment is considered necessary so that follow-up review may be arranged to commence immediately following discharge from in-patient care. The patient should be reviewed immediately after discharge from in-patient care and on-going review should be at 3 monthly intervals (or more frequently if indicated) for at least 2 years, and less frequently thereafter. Overall monitoring should continue for not less than 3 years and in most cases will continue virtually indefinitely, or until the pilot retires. This is because of the significant risk of relapse, which continues for many years following treatment. Review will require supportive, corroborative evidence of continuing abstention from the family, the family doctor and from others in close contact at home or in the workplace. At each review blood tests should be repeated as support for the monitoring process (see above).

Continued attendance at Alcoholics Anonymous or an equivalent organisation is required in most cases. It is also desirable that a peer group member on the same aircraft fleet should act as a “buddy” to supervise the individual’s progress and report to the relevant authority at intervals.

Treatment goals. Total abstinence will usually be the only acceptable treatment goal. For less serious cases (e.g. an elevated GGT with no other evidence of problems arising from alcohol consumption), an attempt at controlling drinking may be allowed, and in such circumstances in-patient treatment will not be required. However, this will be the exception rather than the rule and, in cases of doubt, in-patient treatment and abstinence should both be considered essential for recertification.

Certification. At the end of the first four months of treatment, and provided that abstention is secure, the pilot may be allowed to resume his/her flying role but only in a multicrew capacity. A period of at least two years multicrew limitation will be required, assuming good progress, before solo operations will be authorised. Failure to enter the program or to maintain the protocol will lead to continued suspension of the medical certificate.

Recidivism. Recidivists will usually be disqualified from holding an aviation medical certificate and will not be considered for further certification.
Reinstatement of Aeromedical Certification

Applicants who are disqualified from holding an aviation medical certificate as a result of problematic use of drugs/substances (including alcohol) may subsequently be certified at any class provided they meet the following requirements:

a. The applicant completes a detoxification program (if relevant to the management of the drug/substance condition—eg, alcoholism)

b. The psychiatrist/drug rehabilitation specialist managing the applicant’s case assesses the applicant and provides a report confirming the applicant’s abstinence and prognosis

c. The applicant enters a program of random drug testing/performance assessment at the direction of CASA to confirm continued abstinence.

d. The applicant enters an appropriate peer support program

e. The applicant is regularly reviewed by a psychiatrist/substance abuse specialist and a report is provided to CASA 6 monthly (in the first year).

Applicants will not usually be granted medical certification within 12 months of diagnosis/disqualification for substance abuse. Applicants who have been treated for alcohol related conditions may be considered for medical certification 4 months after detoxification is complete.

Recidivism

Recidivists will usually be disqualified from holding an aviation medical certificate and will not be considered for further certification.
2.6.9 Schizophrenia and Psychotic Disorders

These disorders are grouped together as they frequently include psychotic symptoms as a prominent aspect of their presentation (“psychotic” refers to an “inability to test reality” as evidenced by the presence of delusions, prominent hallucinations, disorganised speech, disorganised or catatonic behaviour).

An established history of schizophrenia or psychotic disorder is an absolute contraindication to aeromedical certification of pilots and ATCs. Occasionally aircrew who can unequivocally be established to have experienced a temporary psychotic episode which, has ceased and is reasonably expected never to recur (e.g. psychosis secondary to an organic, toxic or metabolic cause) may be considered for certification. In such cases, certification will be based on psychiatric and other expert advice on the risk of recurrence.

Applicants and licence holders rarely inform CASA when they are diagnosed with schizophrenia or other psychotic illnesses. Such individuals may have little insight into their illness and may attempt to continue flying/controlling. DAMEs and other medical practitioners who are aware of a patient who holds a pilot or ATC licence and who is suffering from a psychotic illness should immediately notify CASA’s Aviation Medicine Section and, where appropriate, notify the medical certificate holder that this is being done. While this may be personally difficult, the risk posed to the safety of the public as well as to the individual by a psychotic medical certificate holder or applicant is such that notification of CASA is entirely appropriate. The Civil Aviation Regulations and the Civil Aviation Safety Regulations indemnify any medical practitioner who acts in good faith in such circumstances.
2.6.10 Mood Disorders

**Major Depression**

Major depressive disorder is characterised by a clinical course involving one or more episodes of major depression without a history of manic, mixed or hypomanic episodes. Major depressive disorder may have an extremely variable course with some patients experiencing episodes of severe depression separated by long periods without depressive symptoms of any sort, while other patients are entirely debilitated by their almost unrelenting condition. At least 60% of individuals who have a single episode of severe depression will experience further episodes, and 90% of individuals who have had three episodes of severe depression will have subsequent episodes. A significant aeromedical concern is the high mortality associated with this condition, as up to 15% of patients with major depression die by suicide.

However, major depression is also commonly relatively mild in its manifestation and readily treated. Assessment of the aviation risk is thus problematic and is based on considerations such as the worst state the patient has experienced during an episode and the suicide/homicide risk during their worst state. The presence of a significant risk at any time during the course of a depressive illness will be disqualifying for pilots and ATCs. A specialist psychiatric opinion should be sought in any case where there is uncertainty about patient status.

**Bipolar I Disorder (Mania with/without Major Depression)**

The essential feature of this disorder is a clinical course characterised by the occurrence of one or more manic episodes or mixed episodes. More than 90% of individuals who have an episode of mania will go on to have future episodes. Such individuals frequently suffer one or more episodes of major depression or other psychiatric co-morbidities. Completed suicide occurs in 10-15% of such patients.

Bipolar disorder is disqualifying for pilots and ATCs.

**Bipolar II Disorder (Hypomania with Major Depression)**

The essential feature of this disorder is a clinical course characterised by the occurrence of one or more major depressive episodes accompanied by at least one hypomanic episode.

Bipolar disorder is disqualifying for pilots and ATCs.
Cyclothymic Disorder (Numerous Brief Episodes of Hypomania and Minor Depression)

The essential feature of cyclothymic disorder is a chronic fluctuating mood disturbance involving numerous periods of hypomanic symptoms and numerous episodes of depressive symptoms over a period of years (where neither hypomanic nor depressive symptoms are severe or prolonged enough to meet diagnostic criteria for a manic depressive episode). Cyclothymic disorder usually begins insidiously in adolescence and has a chronic indolent course into adulthood. Approximately 15% of sufferers will subsequently develop Bipolar I or II disorder.

Dysthymic Disorder (Prolonged Minor Depression without Mania/Hypomania)

The essential feature of dysthymic disorder is a chronically depressed mood that occurs on most days for several years. Affected individuals describe themselves as being chronically sad or “down in the dumps”. During periods of depressed mood, additional symptoms of depressed appetite, sleep disturbance, low energy levels, low self-esteem, poor concentration and feelings of helplessness may be present. Up to 75% of patients with dysthymic disorder will develop major depression within 5 years.

Pilots and Air Traffic Controllers with dysthymic disorder will not be certificated while they are symptomatic. On remission of symptoms, successfully treated applicants with a good prognosis may be certificated on the basis of a report from a consultant psychiatrist that indicates that the applicant is in remission and at low risk of behaviour that may compromise aviation safety.
Use of Antidepressant Medication by Depressed Pilots and Air Traffic Controllers

CASA may, on a case-by-case basis, certificate applicants who are prescribed (and are taking) the antidepressant medications Sertraline, Citalopram and Venlafaxine as treatment for their depression. CASA is reviewing the antidepressant Moclobemide for possible approval for use by aviators and ATCs. An “as or with co-pilot” or “with direct air traffic controller supervision” condition, as appropriate, may be imposed. Pilots and ATCs taking other types of anti-depressants will not usually be considered for certification. CASA certification of pilots and ATCs taking CASA authorised medications is conditional on:

- Such applicants being under the care of a medical practitioner experienced in the management of depression—the applicant must:
  - Be stable on an established and appropriate dose of medication for at least four weeks before returning to flying/ATC duties and exhibiting:
    - Minimal acceptable side-effects
    - No drug interactions or allergies
  - Be subject to clinical review monthly or more often, with progress reports to CASA at 6 monthly intervals (for at least the first year). The applicant may be involved in other concurrent treatment (e.g. psychotherapy).
  - Have an absence of other significant psychiatric co-morbidities
  - Have no other psychoactive medications
  - Have precipitating factors removed/controlled.
- Symptoms of depression being well controlled, without evidence of psychomotor retardation
- An absence of suicidal ideation or intent
- An absence of features of arousal (e.g. irritability or anger)
- The presence of a normal sleep pattern.

Pilots or ATCs authorised to fly or perform duties when taking Selective Serotonin Re-uptake Inhibitor (SSRI) or related antidepressant medications must cease exercising the privileges of their licences if their antidepressant medication is altered or the dose changed. Their supervising medical practitioner may return them to duty when they are assessed as stable and without unacceptable side effects.

Pilots and ATCs whose medication is being reduced must cease exercising the privileges of their licences for the entire period during which they are weaned off medication plus an additional period of two weeks. Their supervising medical practitioner may return them to duty when they are assessed as stable and without unacceptable side effects.
2.6.11 Anxiety Disorders

DSM IV has eliminated the term neurosis, and dispersed the diagnoses from this former category of disorders amongst four other headings:

- Mood disorders
- Anxiety disorders
- Somatoform disorders
- Dissociative disorders.

Because panic attacks and agoraphobia may occur in the context of any anxiety disorder as well as in association with other mental disorders, they are defined separately hereunder.

**Panic attacks**

Panic attacks are discrete episodes in which an individual experiences a sudden onset of intense apprehension, fearfulness or terror, often associated with feelings of impending doom. During these episodes, symptoms such as shortness of breath, palpitations, chest pain or discomfort, choking/smothering sensations, and fear of “going crazy” or losing control may be present. Attacks occur suddenly, may be unpredictable and usually build to a maximum within 10-15 minutes. CASA will not usually grant aeromedical certification to an individual who suffers non-specific or unpredictable panic attacks.

**Agoraphobia**

The essential feature of agoraphobia is extreme anxiety about being in places or situations from which escape may be difficult (or embarrassing) or in which help may not be available in the event of having a panic attack. The anxiety typically leads to a pervasive avoidance of a variety of situations. Such avoidance may impair an individual’s ability to work or to carry out other responsibilities. CASA may grant aeromedical certification where an applicant’s agoraphobia is unrelated to the aviation environment or unlikely to affect aviation safety adversely.

**Specific Phobia**

The essential feature of this disorder is a marked and persistent fear of clearly discernible, circumscribed objects or situations. Exposure to the phobic stimulus almost invariably provokes an immediate anxiety response. CASA may grant aeromedical certification where an applicant’s specific phobia is unrelated to the aviation environment or is unlikely to affect aviation safety adversely.
Social Phobia (Fear of Embarrassment)

This condition is marked by a significant and persistent fear of social or performance situations in which embarrassment may occur. Exposure to such situations almost invariably provokes an immediate anxiety response and may reduce an affected individual's ability to function in social and occupational circumstances. Most sufferers of this condition avoid these social/performance situations but some may endure such situations with dread. CASA will not usually grant aeromedical certification to an individual who suffers from non-specific or unpredictable social phobias.

Obsessive-compulsive Disorder (Obsessive Thoughts and Compulsive Rituals)

Obsessions are persistent ideas, thoughts, impulses or images that are experienced as intrusive and inappropriate and that cause marked anxiety or distress. Compulsions are repetitive behaviours or mental acts whose goal is to prevent or reduce anxiety or distress. In most cases, an individual with a compulsion feels driven to perform a compulsion to reduce the distress that accompanies the obsession or to prevent some dreaded event or situation. Eventually, the sufferer recognizes that the obsession or compulsion is excessive or unreasonable but feels powerless to prevent it. These disorders may cause marked distress, be extremely time consuming or significantly interfere with an individual’s normal social or occupational circumstances. CASA will not usually grant aeromedical certification to an individual who suffers from obsessive-compulsive disorder.

Post-traumatic Stress Disorder (Non-acute Psychological Consequences of Previous Trauma)

The essential feature of Post-Traumatic Stress Disorder (PTSD) is the development of characteristic symptoms following exposure to an extremely traumatic stressor. Such stressors include a personal near death experience, witnessing the severe injury or death of another or the violent or unexpected death of a family member. An individual’s response must involve intense fear, helplessness, or horror. The characteristic symptoms resulting from exposure to the extreme stressor include persistent re-experiencing of the trauma, avoidance of the stimuli associated with the trauma, numbing of general responsiveness and persistent symptoms of increased arousal. PTSD can occur at any age and symptoms generally begin within 3 months of the precipitating event. CASA will not usually grant aeromedical certification to an individual who is suffering from acute symptoms of PTSD. Certification may be considered once an individual’s symptoms are controlled and the applicant is considered to pose no threat to the safety of air navigation.
Acute Stress Disorder

This condition is characterised by the development of anxiety, dissociative or other psychological symptoms within one month of exposure to an extremely traumatic stressor. Generally symptoms of acute stress disorder begin shortly after exposure to the stressor, peak after 2-5 days, and resolve within a month (otherwise the diagnosis should be changed). CASA will not usually grant aeromedical certification while individual is experiencing an acute stress reaction. Once the condition has resolved, return to flying or ATC duties is likely.

Generalised Anxiety Disorder

In this disorder an individual is afflicted by excessive anxiety about a number of events or activities. The symptoms occur on the majority of days and the individual finds it difficult to control the symptoms. The anxiety and worry are accompanied by one of more of the following:

- Restlessness
- Easy fatigability
- Difficulty concentrating
- Irritability
- Muscle tension
- Disturbed sleep.

Many individuals suffering generalised anxiety disorder report they have been nervous and anxious all of their lives. The clinical course is chronic and fluctuating. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.
2.6.12 Somatoform Disorders

The common feature of this group of disorders is the presence of physical symptoms that suggest an underlying physical condition, but are not explained by that medical condition. The symptoms cause clinically significant distress or impairment in social, occupational or other areas of functioning and are not intentional.

Somatization Disorder

In somatization disorder, the patient experiences multiple symptoms including pain, gastrointestinal symptoms, sexual dysfunction and pseudo-neurological symptoms over several years. Characteristically, this disorder begins before the age of 30 and has a chronic fluctuating course that rarely remits completely. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

Undifferentiated Somatoform Disorder

The essential feature of this disorder is the presence of one or more physical complaints that persist for six months or longer. Symptoms include chronic fatigue, loss of appetite, gastrointestinal or genitourinary symptoms. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

Conversion Disorder

This disorder involves unexplained symptoms or deficits affecting voluntary motor or sensory function suggesting a neurological or other general medical condition. Psychological factors are judged to be associated with the symptoms or deficits. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

Pain Disorder

In pain disorder, the predominant focus of clinical attention is pain. Psychological factors have an important role in the severity, exacerbation or maintenance of this disorder. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

Hypochondriasis

This condition is the preoccupation with the fear of having, or the idea that one has, a serious disease based on a patient’s misinterpretation of bodily symptoms or functions. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.
2. Medical Aspects

2.6 Psychiatry

Body Dysmorphic Disorder

This condition is the preoccupation with an imagined or exaggerated defect in physical appearance (in contrast to anorexia and bulimia where the morbid focus is on body weight). CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

2.6.13 Factitious Disorders

Factitious disorders are characterised by physical or psychological symptoms that are intentionally produced or feigned in order to assume a “sick role”. In contrast to malingering, the motivation of sufferers of factitious disorders is psychological and there is an absence of external incentive for the behaviour. Other psychiatric co-morbidities are frequently present. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

2.6.14 Dissociative Disorders

The essential feature of this group of disorders is a disruption in the integrated functions of consciousness, memory, identity or perception. The disturbance may be sudden or gradual in onset, and may be transient or chronic. Dissociative amnesia, dissociative fugue, dissociative identity disorder, and depersonalisation disorder are included in this group of disorders. CASA will not usually grant aeromedical certification to an individual who suffers from these conditions. Aeromedical certification may be considered should the condition resolve.
2.6.15 Sexual and Gender Identity Disorders

Sexual Dysfunctions

This group of disorders is characterised by disturbance in sexual desire and in the psychophysiological changes that characterise the normal human sexual response. They may cause marked distress and interpersonal difficulty. In general, these disorders are not of aeromedical concern unless the associated psychological distress intrudes on an individual’s ability safely to control and aircraft or perform duty as an ATC.

Paraphilias

The essential feature of this group of conditions is recurrent, intense, sexually arousing fantasies, sexual urges or behaviours involving non-human objects, the suffering of oneself/others, or the non-consensual participation of others in such activities. Affected individuals are rarely self referred and usually come to attention when their behaviour has brought them into conflict with their sexual partners, society, or has reduced on their social, occupational or other areas of functioning.

Affected applicants will not usually be aeromedically certificated until the issues that brought them to attention have been resolved. Successfully treated applicants with a good prognosis may be certificated on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.

Gender Identity Disorders

Patients with gender identity disorder experience strong and persistent cross-gender identification and a persistent discomfort about their assigned sex. The diagnosis depends on evidence of clinically significant distress or impairment in social, occupational or other areas of functioning.

Affected applicants will not usually be aeromedically certificated until the source of the distress or impairment is dealt with, and if appropriate, gender reassignment has been completed. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.
2.6.16 Eating Disorders

**Anorexia Nervosa**

The essential features of this condition are refusal to maintain a minimally normal body weight, intense fear of gaining weight, and significant disturbance in perception of shape/size of the body. Restrictive and binging/purging subtypes of this condition are identified. Many persons with anorexia nervosa exhibit depressive symptoms, others may be obsessive-compulsive, while others may have feelings of ineffectiveness, a strong desire to control the environment, inflexible thinking, limited social spontaneity, perfectionism, restrained initiative and depressed emotional expression. While some persons recover from anorexia completely, others have a relapsing course and the overall mortality of this condition approaches 10%.

CASA will not usually aeromedically certificate applicants who are actively anorexic. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.

**Bulimia Nervosa**

The essential features of this condition are binge eating and use of inappropriate compensatory methods to prevent weight gain. Persons with bulimia also place an excessive emphasis on their body shape. They are frequently depressed or suffer mood disorders and many also meet the criteria for the diagnosis of personality disorder. The lifetime prevalence of substance abuse disorders involving alcohol or stimulants is at least 30% among persons with bulimia.

CASA will not usually aeromedically certificate applicants while they are actively bulimic. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.
2.6.17 Sleep Disorders

Primary Sleep Disorders

This group of disorders includes the dyssomnias (including insomnia, hypersomnia and narcolepsy which are characterised by abnormalities in the amount, quality or timing of sleep) and the parasomnias (characterised by abnormal behavioural or physiological events occurring in association with sleep). Of primary aeromedical concern is the failure of sufferers from these conditions to gain sufficient restorative sleep to ensure optimum alertness and cognitive function when performing duties as pilots and ATCs. Applicants for aeromedical certification will only be considered if studies confirm normal alertness during waking hours (with or without treatment). (Also see Section 2.3 Medical Aspects – Respiratory Disease.)

2.6.18 Impulse Control Disorders

The essential feature of impulse control disorders is failure to resist an impulse, drive, or temptation to perform an act that is harmful to the person or to others. CASA will not usually grant aeromedical certification to individuals who are diagnosed as suffering from such disorders.
2.6.19 Adjustment Disorders

An adjustment disorder may be identified when a person, within three months of an event or stress, develops clinically significant emotional or behavioural symptoms. Such symptoms are either greater than would be generally expected, given the nature of the stressor, or lead to significant impairment in social, educational or occupational function. Stressors may be single or multiple, recurrent or continuous, and may affect either a single person or a group. Patients with adjustment disorders may experience symptoms of depression, anxiety, or may manifest disturbances of conduct. Adjustment disorders generally have a good prognosis and usually remit within six months of the stressor or its consequences ceasing.

Pilots or ATCs should not exercise the privileges of a licence whilst suffering symptoms of an acute adjustment disorder. In some cases, a medical certificate may be suspended. Once psychiatric opinion confirms that the symptoms associated with the adjustment reaction have abated and the acute stressor has been removed or overcome, CASA will usually issue an unrestricted medical certificate.

Personality Disorders

Personality disorders are characterised by enduring patterns of thought and behaviour that deviate markedly from the expectations of a person’s culture. These patterns, which usually begin in adolescence or early childhood, are pervasive, frequently inflexible, stable over time and cause distress, social impairment and often occupational difficulties. A number of specific personality disorders are identified including: antisocial personality disorder; (impulsive, aggressive, manipulative); borderline personality disorder (impulsive, self-destructive; unstable), dependent personality disorder (dependent, submissive, clinging); Histrionic personality disorder (emotional, dramatic, theatrical); narcissistic personality disorder (boastful, egotistical, "superiority complex"); obsessive-compulsive personality disorder (perfectionist, rigid, controlling); paranoid personality disorder (suspicious, distrustful); and, schizoid personality disorder (socially distant, detached), etc.

While personality traits are unique and may enable a person to excel in a particular field, individuals with identifiable personality disorders are likely to have attitudes or perform acts that may be prejudicial to flight safety. Such individuals fail to meet CASA’s psychiatric medical standards and will usually be disqualified from aeromedical certification. Certification may be considered if specialist psychiatric opinion confirms that a pilot or ATC with a personality disorder represents a low risk to aviation safety.
2.6-20 Other Psychiatric Conditions which may be the Focus of Clinical Attention

**Suicidal Ideation or Gesture**

Suicide and attempted suicide are not psychiatric diagnoses per se, but rather symptoms of underlying psychiatric disease. Furthermore, it is uncommon for an individual to use an aircraft as a means of committing suicide.

Those who commit suicide are more often male. The act is carefully planned, precautions taken against discovery, and the method is often violent. The majority of those who suicides are suffering from a depressive disorder, many having significant social problems, and alcohol misuse is a feature in about 15% of cases. In the younger age groups personality disorders are frequently diagnosed, because they are often associated with alcohol or drug misuse, and adverse social factors. Deliberate self-harm is usually an impulsive act, committed in such a way as to invite discovery. Over dosage with minor tranquillisers, antidepressants and non-opiate analgesics is common. Frank major psychiatric illness is uncommon.

In assessing potential risk the following factors should be considered:

- A history of direct statement of intent
- A history of previous self harm
- A previous or current depressive disorder, particularly in the early phase of recovery
- Alcohol dependence, particularly with severe physical or social complications
- Drug dependence
- Social deprivation or loneliness.

Certification may be considered if specialist psychiatric opinion confirms that a pilot or ATC who has attempted or considered suicide represents a low risk to aviation safety. Applicants who have a history of multiple suicide attempts will not usually be granted a medical certificate.
Fear of Flying

DSM IV identifies as a true simple phobia the overt, unabashed, and long-standing fear of flying which usually occurs in people who are not aviators. When an experienced aviator who previously enjoyed flying presents with “fear of flying” it may represent a complex mix of more acute causes and symptoms’ presentations. In such fearful fliers, anxiety about symbolic threats may overlay a rational fear of actual risks; this may represent a reaction to a near or actual accident, or displaced anxiety from a personal crisis. If the flier is not consciously aware of the fear, the focus may be on vague or trivial somatic symptoms, presented in a setting of "I'd like to fly, but—." This attitude presents a striking clinical contrast to the more usual tendency of fliers to understate, if not actually deny, signs and symptoms that they believe may disqualify them from medical certification.

An episode of spatial disorientation or of hyperventilation in flight may trigger intense symptoms of anxiety. Loss of motivation to fly may undermine previously adequate means of coping with the true dangers of flight, particularly in professional aviators. An accident involving the flier or a friend may overwhelm mental defences against such a possibility. Interpersonal conflicts with significant individuals in a non-aviation setting (home, office) may precipitate aviation-related anxieties without any obvious connection to flying except the time of onset.

Whatever its genesis, CASA will not medically certificate a pilot who suffers symptomatic fear of flying until its causes are delineated and the fear has been successfully treated.
2. Medical Aspects
2.6 Psychiatry

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2.7 Nephrology and Urology

2.7.1 Introduction

This section details the assessment of pilots, other aircrew members and Air Traffic Controllers (ATC) who suffers or who may suffer from renal disease or from urological disorders.

The aim of the renal assessment within the aeromedical examination is to ensure that applicants do not suffer from renal or urological conditions which place them at an increased risk of incapacitation or which may produce a decrement in physiological or psychological function sufficient to jeopardise the safety of air navigation. In conducting the aeromedical examination, the DAME will recognise that an individual who holds an unrestricted medical certificate must be capable of performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities may include flight (either as a private or professional pilot):

- For prolonged duration, often as part of a shift roster
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning, and
- Subject to disrupted sleep and time zone changes.

A number of these stressors may also affect ATCs.
2.7.2 Urinary Standard – CASR Part 67

The urinary standards are found in the following paragraphs of CASR Part 67:

- **CASR 67.150** For medical standard 1
  - CASR 67.150(7)
  - Table 67.150
  - 1.19 – 1.22

- **CASR 67.155** For medical standard 2
  - CASR 67.155(7)
  - Table 67.155
  - 2.18 – 2.21

- **CASR 67.160** For medical standard 3
  - CASR 67.160(7)
  - Table 67.160
  - 3.17 – 3.20

2.7.3 Dipstick Testing

**Haematuria**

Urinary ‘dipstick’ testing is required as part of the routine aeromedical examination to screen for the presence of haematuria. Approximately 2-5% of the population have microscopic haematuria, but only about 0.5% who are under age 70 will have a urinary tract cancer as the cause. A positive dipstick test should be repeated, and if negative, managed expectantly. (Most of these applicants will have a minor glomerular lesion.)

Initial aeromedical management of an applicant with a persistently positive dipstick test involves obtaining phase contrast microscopy of a fresh mid-stream urine sample. The sample must be examined within two hours of being passed; thus individuals more than two hours from a suitable pathology service must travel to a location that has that capability. Because of wide variation between laboratories in reporting urine abnormalities, CASA’s relevant requirement for a ‘normal’ assessment in an applicant found to have microscopic haematuria is for three separate urine tests, all of which have less than 20,000 RBC per ml. Phase contrast microscopy of specimens with crenated cells up to 10,000 per ml, indicating a glomerular origin, are considered to be within normal limits. Cells with a ‘non-glomerular’ appearance are likely to indicate a urothelial problem.

Where there is ‘significant haematuria’ (more than 20,000 RBC per ml in any test), initial urogenital imaging is to be by Ultrasound or Intravenous Pyelogram (IVP), as some 10% of all stones are radiolucent. The requirement for further investigation should be determined on clinical grounds and on the basis of investigation results.
Proteinuria

Orthostatic proteinuria can be excluded by testing an early morning urine specimen. If an early morning specimen remains positive for protein, then a 24-hour urine protein estimation is required. Normal is <150mg protein/day.

2.7.4 Urinary Calculi

There have been no reported episodes of incapacitation involving CASA certificate holders with a known history of renal calculi. However, there have been several untoward incidents as a result of undiagnosed or unreported stone. The aviation environment may predispose aircrew to stone formation due to the low humidity environment often found in aircraft cockpits, and because of a tendency for some pilots deliberately to under-hydrate to avoid the need to urinate, particularly where there is no toilet on the aircraft.

The presence of any stone or stones in the urinary system is aeromedically significant. (For CASA certification purposes, there is no such entity as an asymptomatic stone). Renal stones as small as 1-2 mm diameter can and do cause significant symptoms. There are no reliable prognostic indicators that can determine if a stone will or will not cause symptoms, and the chance of a stone present for 10 years moving in the subsequent 24 hours is the same as it moving after being present for 10 days. The time a stone has been present is not a reliable indicator of risk.

Single Renal Stone (Passed or Removed)

In applicants who have had a single episode of renal colic, about 50% will have a repeat episode within 5-7 years, and nearly 100% within 12-15 years, unless they modify their behaviour. However, for applicants who have passed all stones or had them removed and who are able to maintain adequate urine flow (>2 litres/day), the risk of stone recurrence is the same as for the general population. Thus CASA will certificate pilots and ATCs who have experienced a single episode of renal stone disease, with successful removal or passage of the stone. In such cases, the only surveillance need be by urine dipstick at routine CASA medical examinations.

Recurrent Renal Stones (Passed or Removed)

Pilots and ATCs who have experienced recurrent episodes of renal stone disease may be recertificated once they are proven to be free of all stones in the kidney or renal tract, have normal renal function and have adopted appropriate risk minimisation behaviour. CASA will require the following annual investigations and reports in these cases:

- Plain abdominal X-ray or ultrasound
- 24-hour urine calcium and urate estimations
- Urological review.
Retained Renal Stones

Where stone material remains in the renal substance or urinary tract, CASA will not permit unrestricted Class 1 or Class 3 certification unless there are clear mitigating factors that preclude renal colic, such as a staghorn calculus, a calculus in a diverticulum, or a stone clearly embedded in the renal substance. (Further stone movement is extremely unlikely in such cases.) Pilots or ATCs with staghorn calculi may be suitable for certification, on a case-by-case basis, until stone removal, provided they are asymptomatic, their renal function is normal, and movement of the calculus is considered unlikely. CASA may entertain unrestricted certification for Class 2 applicants in similar circumstances, on a case-by-case basis, and subject to annual urological review.

Approximately 20% of patients will have residual calculi three months after undergoing Extracorporeal Shockwave Lithotripsy (ESWL). Where there is a small stone or remnant following attempted removal with ESWL, generally accepted management is to leave the stone alone. However, due to the risk of inflight incapacitation with residual stone fragment movement, it may be worthwhile to offer removal of stone remnants via flexible ureteroscopy. There is currently an approximate 50% success with this procedure, but its risks include urine extravasation, which can be extremely painful. Percutaneous nephrolithotomy (PCNL) may be a better option for pilots to ensure a stone free status.

2.7.5 Medullary Sponge Kidney

Persons with medullary sponge kidneys (MSK) tend to be chronic renal stone formers. Therefore, most applicants for pilot or ATC certification who have MSK will not be issued an aviation medical certificate of any kind. However, CASA may certificate pilots or ATCs with this condition, on a case-by-case basis, if they have a history of one episode of renal colic or fewer, and if there are no residual stones demonstrated on investigation. (Beware of the applicant with only a radiological diagnosis of MSK and no history of stones or calcification. Many such persons have only a prominent medullary blush with no adverse implications for aeromedical certification.)
2.7.6 Glomerulonephritis

**Thin Membrane Disease**

Thin membrane disease (TMB) is due to a type IV collagen genetic defect and occurs predominantly in females. It has no major health implications and is considered benign for the purpose of CASA aeromedical certification. Patients with TMB often have an incidental finding of 80,000-100,000 RBC per ml of urine, but further investigation reveals no other abnormalities. If blood pressure is normal and renal function tests are normal (including 24-hour urinary protein excretion and 24-hour creatinine clearance), CASA will accept a presumptive diagnosis of TMB and will not require further investigation. While biopsy may be offered to confirm the diagnosis of TMB, such an investigation is not required for aeromedical certification.

Where TMB is confirmed by biopsy, there is no requirement for any surveillance. In the case of a presumptive diagnosis, the result of a serum creatinine study is required with every subsequent CASA medical examination.

**IgA Nephropathy**

This condition was formerly considered to be benign, but it is now clear that it may later lead to renal failure in some persons. Risk of disease progression is greater when it is associated with hypertension, abnormal renal function test results and renal scarring, detected on biopsy. In the absence of such abnormalities, the risk of renal failure in cases of IgA nephropathy is about 1% after 20 years. The condition is of aeromedical concern because of the risk associated with subtle incapacitation due to circulating toxins produced as renal failure progresses. Rapid progression to nephrotic syndrome may also occur. CASA will usually certificate pilots and ATCs who are affected by IgA nephropathy. Required surveillance measures are:

- 24-hour urine protein estimations
- Serum albumin testing
- Renal function testing.

All of these tests are to be done at six-monthly intervals.
2.7.7 Nephrotic Syndrome

Many persons affected by this condition recover spontaneously, while others respond well to treatment with steroids. If immunosuppression is necessary for treatment, pilots and ATCs may not exercise the privileges of their licences until treatment is complete. CASA will consider recertification once the condition has resolved, medication has been ceased and renal function has returned to an acceptable level (defined as protein excretion <3g per day).

2.7.8 Renal Failure

For aeromedical certification purposes, renal failure is defined by biochemical markers of impaired renal function. Physical symptoms of renal failure occur late in this disease and represent manifestations of severe end stage renal failure.

The main marker of renal function is the serum creatinine level. Most persons with chronic renal impairment who have a creatinine level <200 micromol/L suffer no untoward effects. (However, DAMEs should recall that a creatinine level <200 micromol/L may evoke severe symptoms in cases of acute renal impairment). Where an applicant’s creatinine level is between 200 and 500 micromol/L, the DAME’s clinical acumen will be required to determine fitness for exercise of licence privileges. A creatinine above 500 micromol/L invariably produces untoward health effects, including:

- Slowed mentation
- Poor concentration
- Lethargy
- Gastrointestinal disturbance
- Other electrolyte disturbances
- Rapid deterioration with intercurrent illness.
Aeromedical Disposition

When there are three test results of >500 micromol/L creatinine, the DAME should advise the applicant not to exercise the privileges of his/her licence and inform CASA of the details. Following a single initial test result of >500 micromol/L creatinine, the certificate holder should be advised not to exercise privileges, and a further test arranged for 48 hours later. If the second test confirms the original result, a third test is required 48 hours later again. The DAME should inform CASA Aviation Medicine Section of the results, and CASA will usually suspend the applicant’s medical certificate. For reported creatinine levels between 200-500 micromol/L, the DAME will consider the possible effect on safe aviation of symptoms such as those listed above, and either advise the applicant accordingly or discuss the matter with CASA Aviation Medicine Section.

Acute renal impairment is usually associated with a significant insult which itself precludes a medical certificate holder from flying or controlling. Once recovered from the precipitating cause of acute renal failure, CASA will consider recertification on a case-by-case basis.

Renal Dialysis

Persons undergoing renal dialysis usually have significantly high creatinine levels, even soon after completing a dialysis session. Their electrolyte levels may be abnormal because of large fluid shifts that accompany dialysis. Consequently, persons undergoing renal dialysis may remain symptomatic for several hours following dialysis. CASA will not usually certificate pilots or ATCs with chronic renal failure who are undergoing dialysis (of any type). Very well controlled pilots and ATCs may be granted special certification, on a case-by-case basis, permitting exercise of privileges in the period between 12 and 36 hours (only) following a dialysis.

Renal Transplant

Following renal transplantation, most recipients receive immunosuppressants to prevent tissue rejection. They have increased risks of hypertension and of ischaemic heart disease, also of developing carcinoma. Some transplant recipients have minimal complications and normal renal function. CASA will not consider aeromedical certification for pilots or ATCs until 12 months following transplantation. If the applicant is then receiving standard immunosuppressant therapy, has well controlled blood pressure, and renal function is at an acceptable level, CASA, may consider recertification, on a case-by-case basis.
2.7.9 Single Kidney

If an applicant has a single kidney and this condition is developmental, renal function testing should be undertaken. If this is normal, aeromedical certification will be unaffected. If an applicant has a single kidney due to nephrectomy, the cause of the kidney's removal must also be considered. If the underlying cause does not affect certification, then the same considerations of renal function testing and aeromedical disposition apply as for developmental variations.

2.7.10 Urinary Tract Infections

**Female**

In the young adult female, isolated urinary tract infection (UTI) is common. Investigation rarely reveals a specific cause. A small percentage of women will develop chronic or recurrent UTIs. They require investigation (including IVP) to exclude underlying anatomical causes. Some of them may need antibiotic cover for extended periods and/or post coital antibiotic prophylaxis. Female applicants receiving antibiotic treatment for recurrent UTIs are unlikely to adversely affect the safety of air navigation, and there need be no restrictions on their aeromedical certification.

**Male**

A UTI in a male usually indicates the presence of an anatomical abnormality in the urinary tract. The diagnostic yield from investigations is about 50%. Adequate investigation must include IVP and cystoscopy. Future aeromedical certification will depend on the findings from investigations.

2.7.11 Prostatitis

Acute bacterial prostatitis should be managed as an acute intercurrent illness (like UTI) and the pilot or ATC returned to duty only when fully recovered. Non-bacterial or chronic prostatitis is considered to be a form of pelvic pain syndrome, often accompanied by significant psychological overlay, analogous to the findings in Irritable Bowel Syndrome. Chronic prostatitis is often distracting and may be difficult to manage. Best pharmacological management is with anti-inflammatory and/or anti-depressant medications. CASA will determine future aeromedical certification of affected applicants on a case-by-case basis. The DAME should closely assess the psychological status of any affected pilot or ATC before making a recommendation concerning aeromedical disposition.
2.7.12 Urinary Outflow Obstruction

Benign prostatic hypertrophy (BPH) is the commonest cause of outflow obstruction in Australian males. Acute urine retention occurs in persons affected by BPH at the rate of 5-8% per annum. There is also a small risk of chronic incapacitation due to reduced renal function.

An acute retention episode may be treated by surgery, or by use of an alpha-blocker medication. Successful surgery will usually result in clearance to return to flying or controlling as soon as the applicant has fully recovered from the effects of the surgery. Note that alpha blockers may reduce G-tolerance—the more specific the drug, the better tolerated. Tamsulosin or alfafusin are highly selective, but are seldom prescribed in Australia as they are not currently listed on the PBS. Prazosin is listed on the PBS, but is less selective than other available agents and has more side effects. Prazosin use is not compatible with agricultural or aerobatic flying, and medical certification for pilot applicants using it will contain appropriate restrictions.

2.7.13 Testicular Cancers

Also see Section 2.14, Malignancy.

Teratoma

The progress or recurrence of teratomas may be determined by use of an appropriate marker. Chemotherapy is the usual treatment and there is >90% cure rate. When the applicant has a stage A tumour and markers are normal, early return to duty may be possible. For stage B tumours, where adequate treatment requires 3-4 cycles of chemotherapy, return to duty will be delayed until at least three months after completion of chemotherapy. All such cases should be referred to CASA Aviation Medicine Section for determination of aeromedical disposition.

Seminoma

Seminomas are very sensitive to radiation, and a very low radiation dose may be curative. As there is no reliable marker available at present, surveillance can be difficult. Once treatment is complete, early return to duty may be possible. All such cases should be referred to CASA Aviation Medicine Section for determination of aeromedical disposition.
2.7.14 Prostatic Carcinoma

Prostate Specific Antigen (PSA) is a very reliable marker for progress of established prostatic cancer. However, it is unreliable as a screening test and there is still no normal range defined for it. Risk of prostate cancer against PSA may be graphed, and most laboratories recommend further investigation when a PSA is >4, but positive predictive value is poor at this level. Once PSA reaches 12, the PPV is close to 1.

In established disease, the PSA is a proxy measure of prostate bulk and of cell turnover. PSA levels >50 are associated with a significant risk of pathological fractures, cerebral and other metastases. However, applicants with prostate cancer and a PSA of <30 have a positive bone scan in <1% of cases. An applicant with PSA of <20 will have cancer mass of only a few grams, while a PSA <12 is not associated with significant risk of metastases.

**Aeromedical Certification**

Post-radical prostatectomy, if the operation has been successful, PSA should fall to undetectable level. If the level remains undetectable at three years post surgery, there is <5% chance of recurrence of disease. In such circumstances, applicants can be considered cured after four years. Radiotherapy now produces similar outcomes and if PSA remains at nadir levels for 3-4 years following radiotherapy, a similar assessment may be made. Usually, certification for all classes of medical certificate may be possible 3-4 months post surgery or after completion of radiotherapy. CASA will require annual follow up urological reports and PSA estimations. However, if the PSA remains undetectable five years after surgery, no further reports will be required.

Pilots and ATCs with advanced prostatic cancer and PSA >30 must also undergo bone scan as part of their required investigations. CASA will usually only contemplate certification for this group on the basis of ‘as-or-with co-pilot’ or ‘as-or-with second controller only’.

Treatment with anti-androgen therapy produces significant side effects in about 10-20% of cases, particularly lethargy. LHRH agonists may rarely cause a chronic confusional state. Prior to return to duties, an applicant receiving anti-androgen therapy will require an operational check. (Also see Section 2.13, Medication – Drugs and Flying / Controlling.)
2.7.15 Renal Cell Carcinoma

Cerebral spread from a renal cell carcinoma is highly likely. Previously, this cancer has usually been detected late, and affected persons have had poor survival rates. However, recently these tumours have often been detected incidentally by ultrasound. 80% of these tumours are now <5cm in diameter when found, and five-year survival in those affected persons is >90% following treatment. Even for larger tumours (<10cm), five-year survival is >70% following treatment.

**Aeromedical certification**

As the outcome of renal cancer is unpredictable, and as cerebral metastases are common, CASA will determine aeromedical disposition of pilots and ATCs with this condition on a case-by-case basis. If granted, initial certification is likely to be ‘as-or-with co-pilot’ or ‘as-or-with second controller only’. Certification will not be granted until at least six months following completion of treatment. Unrestricted class 1 certification will not be considered until at least three years post treatment. Class 2 applicants will be considered for unrestricted certification after two years, and Class 3 applicants after one year. CASA requires follow up investigations as follows:

- Six-monthly CT scans for Class 1 applicants
- Annual CT scans for class 2 and 3 applicants.

In all cases, additional investigations must include Full Blood Examination (to exclude polycythaemia), Liver Function Tests, and Urea and Electrolyte estimations.

After 10 years without recurrence of tumour following treatment, an applicant may be deemed ‘cured’. Thereafter, no additional surveillance measures will be required.
2.7.16 Polycystic Kidneys

Polycystic kidneys (PCK) may be associated with several complications that could adversely affect the safety of air navigation. These include acute pyelonephritis, haemorrhage into cysts, renal stones, berry aneurysms and cardiac valvular disease. However, most persons with polycystic kidneys do not experience these complications. The commonest side effect of the condition is hypertension, usually readily controlled by medication. Due to the statistical association of polycystic kidneys with berry aneurysm, all applicants with known PCK must provide the result of a recent Magnetic Resonance Angiogram (performed within 12 months). If this is normal, CASA will usually approve medical certification. However, the test must be repeated and results provided to CASA at intervals of five years while medical certification is maintained. If the DAME detects any cardiac murmur when examining an applicant with PCK, CASA requires an echocardiogram and report for initial certification. This is also the case when any new murmur is noted.

2.7.17 Amyloid

This is a systemic disease with possible renal, neuropathic and cardiological manifestations. On diagnosis of the condition, inform CASA Aviation Medicine Section and advise the applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA. Following appropriate investigations, CASA will determine aeromedical disposition on a case-by-case basis.
2.8.1 Gynaecological and Obstetric Standard – CASR Part 67

CASR 67.150 For medical standard 1

CASR 67.155(7)
Table 67.150
1.23 – 1.24

CASR 67.155 For medical standard 2

CASR 67.155(7)
Table 67.155
2.22 – 2.23

CASR 67.160 For medical standard 3

CASR 67.160(7)
Table 67.160
3.21 – 3.22

2.8.2 Severe Menstrual Disturbances

Applicants with a history of severe menstrual disturbances resistant to treatment must be assessed with caution. Such applicants are likely to be unacceptable for issue of a Class 1 or Class 3 Medical Certificate.

2.8.3 Pregnancy

Pregnancy, particularly during the final trimester, is a cause of temporary unfitness to exercise the privileges of all aviation licences. However, where the obstetrician or other medical practitioner supervising the pregnancy certifies that an applicant or medical certificate holder has no significant medical contraindications related to the pregnancy, she may be assessed as meeting the appropriate medical standard(s). The exercise of licence privileges in such circumstances may involve imposition of appropriate, individually determined operational restrictions.

The risk of acute incapacitation from premature labour exceeds 1% after 30 weeks gestation. Consequently, all medical certificate holders are advised not to exercise licence privileges after 30 weeks gestation.

Class 1 and 2 medical certificate holders are formally deemed medically unfit to exercise licence privileges from 30 weeks gestation until cleared by a post-partum assessment conducted in accordance with the last paragraph in this section.
Class 3 medical certificate holders may exercise relevant licence privileges until 34 weeks gestation provided that:

i. The obstetrician or other medical practitioner supervising the pregnancy certifies that the licence holder is fit for duties during this period; and

ii. Suitable administrative arrangements are made which ensure that sudden incapacitation of an affected licence holder due to premature labour will not adversely affect the safety of air navigation.

Thereafter, Class 3 medical certificate holders also are formally deemed medically unfit to exercise licence privileges until cleared by a post-partum assessment conducted in accordance with the following paragraph.

Following delivery, applicants are required to obtain a clearance from a DAME before once again exercising the privileges of an aviation licence. Depending on the stage of a pregnancy at which the event occurs, such clearance may also be required following a miscarriage, stillbirth or termination of pregnancy. Pregnancy is considered a medically significant condition and DAMEs should remind pregnant applicants of their obligations under CASRs to refrain from exercising their licence privileges until medically cleared. (See also 1.4.5 Temporary Incapacity of Certificate Holders.) Following a normal delivery, clearance to resume flying duties should be appropriate at six weeks post-partum.
2. Medical Aspects
2.9 Gastroenterology

2.9.1 Introduction

Any disease of the gastrointestinal tract that is active, or liable to recurrence, especially if it is likely to cause sudden incapacitation in flight, should be appropriately investigated before a final decision on medical certification is made. Diseases that have resolved are usually compatible with certification.

2.9.2 Alimentary System Standard – CASR Part 67

The alimentary system standards are found in the following paragraphs of CASR Part 67:

- CASR 67.150 For medical standard 1
  - CASR 67.150(7)
  - Table 67.150
  - 1.14 – 1.15

- CASR 67.155 For medical standard 2
  - CASR 67.155(7)
  - Table 67.155
  - 2.13 – 2.14

- CASR 67.160 For medical standard 3
  - CASR 67.160(7)
  - Table 67.160
  - 3.13 – 3.14

2.9.3 Peptic Ulcer

Applicants with active ulceration, presenting with haematemesis or melaena or diagnosed at gastroscopy or barium meal, are unlikely to meet the standard. They may be reconsidered when active bleeding is controlled. Applicants who require long-term therapy including H2 antagonists to remain ulcer free are considered individually. Full reports are necessary.

Cases of surgically treated ulcer are assessed individually, and usually "pass".
2.9.4 Biliary Tract Disorders

Acute gall bladder disease and bile duct disease are contraindications to medical certification. Once resolved, certification is usually possible without restriction.

2.9.5 Pancreatitis

The most common aetiological factors in pancreatitis are alcoholism and gall stone disease. These should be sought and excluded, or commented on. If the pancreatitis is idiopathic and mild, the applicant may be “passed” as fit. Full reports are required.

2.9.6 Gastritis

Cases are assessed individually, but are usually acceptable for certification. DAMEs should consider aspirin and/or alcohol as contributory factors when eliciting the applicant’s history.

2.9.7 Gastroenteritis

Gastroenteritis is the commonest cause of in-flight incapacitation amongst aircrew. DAMEs should be prepared to discuss the condition with applicants and to advise on appropriate measures for prevention, particularly if flight into areas of "high risk" is contemplated. This condition does not normally have any adverse implications for medical certification.

2.9.8 Colostomy and Ileostomy

These procedures are not normally contraindications to certification. However, the reason for the operation and the nature of any underlying disease must be fully documented and reported to the Aviation Medicine Section.

2.9.9 Hernia

A hernia, which has the potential for obstruction and/or strangulation, is unacceptable for certification. Other hernias are acceptable.
2.9.10 Ulcerative Colitis and Crohn's Disease

The Aviation Medicine Section will assess each case individually. Frequency of bowel actions and current state of general health should be reported in detail. Once in remission, applicants are usually medically cleared, with the requirement for an annual specialist report on the progress of the condition.

2.9.11 Splenomegaly

The detection of an enlarged spleen requires appropriate investigation. Haematological conditions and portal hypertension should be considered, as well as excessive alcohol intake. (See also 2.10 Haematology and Reticuloendothelial Conditions.) DAMEs should issue a "doubtful" assessment and refer applicants to Aviation Medicine Section. Full investigation is required in each case to facilitate assessments.

2.9.12 Liver Disease

Despite the number of varieties of liver disease, the principal concerns for aviation safety arise from alcohol abuse, oesophageal varices, encephalopathy and bleeding disorders. If varices are suspected, full specialist reports are required. The assessment is likely to be "fail". Applicants with bleeding disorders and encephalopathy will be assessed as "fail". Liver function test results should be obtained if clinically indicated.
2. Medical Aspects
2.9 Gastroenterology
2.10 Haematology and Reticulo-endothelial Conditions

2.10.1 Introduction

Applicants with haematological conditions are considered individually depending on the nature of the condition, its cause (if known) and natural history. The overriding concern is that the blood must carry sufficient oxygen to satisfy metabolic requirements during all phases of flight.

2.10.2 Reticulo-endothelial System Standard – CASR Part 067

CASR 67 The Reticulo-endothelial System standards are found in the following paragraphs of CASR Part 67:

<table>
<thead>
<tr>
<th>CASR 67.150</th>
<th>For medical standard 1</th>
<th>CASR 67.150(7) Table 67.150 1.17 – 1.18</th>
</tr>
</thead>
<tbody>
<tr>
<td>CASR 67.155</td>
<td>For medical standard 2</td>
<td>CASR 67.155(7) Table 67.155 2.16 – 2.17</td>
</tr>
<tr>
<td>CASR 67.160</td>
<td>For medical standard 3</td>
<td>CASR 67.160(7) Table 67.160 3.16</td>
</tr>
</tbody>
</table>

2.10.3 Anaemia

Applicants whose haemoglobin is less than 100 g/l should be investigated as clinically indicated. Final assessment depends on the results of haematological investigations and response to treatment. Full reports are required.

2.10.4 Polycythaemia

Applicants with higher than normal haemoglobin must be appropriately investigated. In secondary polycythaemia due to lung disease, the lung disease is more important. Applicants with polycythaemia vera, untreated or uncontrolled, will be assessed as failing to meet the standard, but will be reconsidered depending on their response to treatment, and on specialists’ reports.
2.10 Haematology and Reticulo-endothelial Conditions

2.10.5 Acute Leukaemia

Acute leukaemia of any type is disqualifying. Applicants assessed as in remission may be permitted to exercise the privileges of the licence held, depending on specialists’ reports. Full details are required.

2.10.6 Chronic Leukaemia

Chronic leukaemias are assessed individually. A specialist’s report is required in every case, including a statement on prognosis for the next year (re-certification is year by year, if at all). Some chronic leukaemias, e.g. CGL, CLL and other myeloproliferative diseases, are usually associated with an enlarged spleen. There is a consequent risk of splenic infarction and rupture (spontaneous or traumatic) in these applicants.

2.10.7 Lymphomas

Applicants with lymphoma are assessed individually. A lymphoma in remission, especially Hodgkin’s Disease, is usually consistent with a pass assessment for applicants concerned. Annual specialist reports are required in all cases.

2.10.8 Haemoglobinopathy

Applicants with abnormal haemoglobins (HbS) are assessed individually. Full reports to Aviation Medicine Section are required.

2.10.9 Haemophilia

Applicants may be certified at the Class 2 level if the condition is stable. Full reports from the treating physician are required.
2.10 Oncology

Assessment of applicants with any diagnosis of malignancy is based upon the following considerations:

- Nature of tumour
- Stage of development/invasion
- Response to therapy
- Likelihood of recurrence in a form likely to be incapacitating, e.g. cerebral metastasis.

In general, applicants who are no longer receiving chemotherapy or radiotherapy, in whom the risk of incapacitation is considered to be low during the period of currency of the Medical Certificate, are given a pass assessment subject to continued medical surveillance.

Also see Section 2.14 Malignancy.

2.11 HIV Disease

Applicants who are HIV positive but without clinical disease may be certified at the Class 2 level and receive restricted certification (as or with co-pilot) at the Class 1 level.

Applicants should obtain reports (including CD4 helper cell count) from their treating physicians prior to seeking renewal.

When an applicant develops clinical illness associated with HIV disease, further certification is determined on a case-by-case basis. Full clinical details are required.

2.12 Blood Donation

In healthy individuals, the fluid depletion that accompanies donation of one unit of blood is replaced within several hours. Any effects from the loss of haemoglobin should not be significant for normal flying operations.

Active pilots should be discouraged from flying until 24 hours have elapsed following blood donation.
2.11 Introduction

When an applicant has a non-trivial orthopaedic or arthritic disability such as loss or partial loss of a limb, joints with a limited range of movement, or significant muscular weakness, the following information is required:

- A detailed description of the condition and any associated clinical problems
- An indication of whether the condition is progressive, static or likely to improve
- The nature and degree of any movement limitation
- The extent of any associated loss of power or co-ordination
- An indication of how the limitation is likely to affect the applicant’s ability to control an aircraft.

It may be necessary for an applicant with such a condition to undergo a practical (cockpit) check in the aircraft type he or she wishes to fly. Generally, if an applicant can demonstrate the ability to carry out all required normal and emergency actions, with a prosthesis if necessary, certification is possible. Appropriate restrictions may be placed on the licence (e.g., not to fly aircraft with toe-operated brakes, not to fly multi-engine aircraft, etc).

In applicants with arthritic conditions, the nature and dose of medication required to control the arthritis is an important consideration. In those arthritides associated with systemic disease (e.g., rheumatoid arthritis), signs of systemic involvement should be sought and recorded. Each case is assessed individually and full clinical details are required.

2.11.2 Skeletal System Standard – CASR Part 67

The skeletal system standards are found in the following paragraphs of CASR Part 67:

- CASR 67.150 For medical standard 1
  - CASR 67.150(7) Table 67.150
    - 1.25 – 1.26

- CASR 67.155 For medical standard 2
  - CASR 67.155(7) Table 67.155
    - 2.25 – 2.25

- CASR 67.160 For medical standard 3
  - CASR 67.160(7) Table 67.160
    - 3.23 – 3.24
2.11.3 Paraplegia

A number of applicants with paraplegia have been licensed at the private pilot level after passing a cockpit check. The applicant's condition must be stable for this to be possible. Full details of medications taken should be recorded, as these may include diazepam and/or baclofen for control of muscle spasm, and alpha agonists or tricyclics to aid sphincter control. Full reports are required.

The pilot has a responsibility to help evacuate passengers in the event of a crash or emergency landing. Four per cent of light aircraft accidents are followed by fire, so an ability to leave the aircraft is essential. Applicants with paraplegia must be aware of the added risk to themselves and their passengers. For this reason, such applicants who apply for a professional pilot Medical Certificate are usually assessed as "fail".

Applicants with paraplegia who apply for an ATC licence are assessed individually.
2.12.1 Ear, Nose and Throat Standard – CASR Part 67

The ear, nose and throat standards are found in the following paragraphs of CASR Part 67:

- **CASR 67.150**
  For medical standard 1
  CASR 67.150(7)
  Table 67.150
  1.27 – 1.28

- **CASR 67.155**
  For medical standard 2
  CASR 67.155(7)
  Table 67.155
  2.26 – 2.27

- **CASR 67.160**
  For medical standard 3
  CASR 67.160(7)
  Table 67.160
  3.25 – 3.26

2.12.2 Hearing Requirements Standard – CASR Part 67

The hearing requirements standards are found in the following paragraphs of CASR Part 67:

- **CASR 67.150**
  For medical standard 1
  CASR 67.150(7)
  Table 67.150
  1.29 – 1.30

- **CASR 67.155**
  For medical standard 2
  CASR 67.155(7)
  Table 67.155
  2.28 – 2.30

- **CASR 67.160**
  For medical standard 3
  CASR 67.160(7)
  Table 67.160
  3.27 – 3.28

2.12.3 Examination of the Ear

There should be no signs of active disease of the middle ear cavity. Applicants should be able to ventilate the middle ear.

Perforations of the tympanic membrane are acceptable, however the cause of the condition should be sought and investigations initiated, if appropriate.
2.12.4 Hearing

An applicant for a Class 2 Certificate must be able to hear an average conversational voice at two metres with the back to the examiner. Accordingly, applicants who are deaf in one ear may pass.

More rigid standards apply to professional licence holders. Audiograms are required for initial Class 1 and 3 and at defined intervals thereafter.

If any doubt arises as to the acceptability of an applicant's hearing, an audiogram should be obtained and, if appropriate, specialist consultation recommended. The audiogram printout should be enclosed with the medical report for initial issue Class 1 and 3 examinations.

Audiograms are acceptable from facilities other than Australian Hearing Services (AHS) facilities. Applicants who are found for the first time to be within 10dB of the limits stated in the schedule should be retested by AHS. Where the deficit is long-standing and has been previously recorded, a non-AHS audiogram will be acceptable provided it demonstrates no significant deterioration.

Where a supplementary speech test is required, this can only be performed by AHS as the calibrated tapes and other equipment required are not available elsewhere. If the applicant fails the speech-based hearing test, in some cases an in-flight test may be offered if he/she has a high level of aeronautical experience. Such an operational check will involve evaluation of relevant aspects of the applicant's hearing by a CASA Flying Operations Inspector or an Authorised Testing Officer with test material transmitted from a control tower. Ideally the test should be conducted in the class of aircraft, which is the same as that which the applicant normally operates or intends to operate.

Applicants for Class 2 Certificates may wear hearing aids during testing. Any applicant who meets the hearing standard in this way is required to wear the aid during all communications on the ground that relate to the conduct of a flight. Adequate amplification during flight may be achieved by the use of headphones. Headphones with ear cups have the added advantage of blocking out aircraft noise. All pilots should be encouraged to fly with headphones, in the interests of improving hearing and for hearing conservation.

2.12.5 Vestibular Function

Any history of vertigo or dizziness should be fully investigated and the presence of nystagmus noted. If there is concern about vestibular function, referral for caloric testing and electronystagmography should be considered.
2.12.6 Speech

Any significant speech impediment or stuttering should be reported, and full details are required. As a minimum, reports from an ENT specialist and from a speech pathologist should be obtained and forwarded to Aviation Medicine Section, together with the DAME’s own assessment of the condition and its likely effects on the safety of air navigation.

2.12.7 Sinuses

Applicants with acute sinusitis are "temporarily unfit" for aviation duties. Chronic sinusitis is unacceptable until appropriately referred, treated and improved.
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2. Medical Aspects

2.13 Medication – Drugs and Flying/Controlling

2.13.1 Introduction

The increasing use of drugs, both prescribed and self-administered, within the Australian community, presents a significant challenge to DAMEs when determining an applicant’s fitness for aviation related duties. All drugs, even those purchased “over the counter (OTC)”, may have adverse effects that may render aircrew members or air traffic controllers unsafe to fly or to perform their normal duties.

General Principles

As a general principle, DAMEs should assume all medications are hazardous for aviation operations until demonstrated otherwise.

When assessing whether a pilot or Air Traffic Controller (ATC) taking medication is fit for aviation-related duties, two principal issues should be considered:

- The potential for the underlying medical condition to affect fitness for flying or controlling duty
- The potential for the treatment (including drug therapy) to reduce fitness for flying or controlling duty.

The following characteristics of specific compounds will influence the limitations on their safe use in the aviation environment:

- Unwanted, dose-related drug effects (e.g. blurred vision or drowsiness)
- Hypersensitivity/allergic reactions
- Idiosyncratic effects
- Drug side effects that may occur in some of the population (e.g., nausea, liver damage or bone marrow suppression)
- Drug combination effects – potentiation
- Drug interactions; particularly with alcohol, to increase risk of side effects or reduce activity of the drug/s.
Virtually all drugs unacceptable for aviation duties, regardless of the nature of the disorder being treated, have one or more of the following effects:

- CNS depression
- CNS stimulation
- Autonomic nervous system disturbance
- Disturbance of equilibrium.

**Determination of Fitness for Aviation Duty when Taking Medications**

It is not practicable in this chapter to indicate whether a specific drug or even class of drug is always compatible with safe flying or controlling. Rather, this chapter provides a general overview of many commonly used medications and their use in the flying environment. Whenever a DAME is in doubt about a pilot or controller who is taking a drug or medication, advice should be obtained from the CASA Aviation Medicine Section.

With regard to their effect on fitness for aviation duties, medications may be divided into five groups:

A. Those medications considered safe when flying or controlling.

B. Those medications generally considered compatible with aviation duties without restrictions once the possibility of idiosyncratic reaction has been eliminated (generally after a period of ground trial). Applicants using these substances may be cleared to exercise the privileges of their licences by a DAME.

C. Those medications which may be compatible with aviation duties, but which require a specific assessment by CASA. Only CASA can clear pilots and ATCs to use these drugs while performing aviation-related duties.

D. Drugs that are not compatible with flying or ATC duties.

E. Those medications that do not fit any of the above groups, or where there is uncertainty. In such cases, the DAME should either:
   - Contact CASA’s Aviation Medicine Section prior to any decision to certificate or not certificate a licence holder or applicant; or
   - Not endorse the certificate and refer the matter to AMS for determination.
A. Medications compatible with flying or controlling

The following medications may be taken without consultation:

- Simple analgesics such as single doses of aspirin, paracetamol, and ibuprofen to provide analgesia may be used for minor self-limiting conditions. Paracetamol is preferable as there is less risk of gastric irritation. Medications containing Codeine should not be used for this purpose.
- Simple antacids may be used for mild isolated episodes of gastric disturbance. Mixtures containing anticholinergics or antispasmodics should not be used by an applicant engaged in aviation duties. Simple antacids do not include H₂ receptor antagonists.
- Antidiarrhoeals such as kaomagma, kapectate and bismuth subcitrate are acceptable for mild afebrile diarrhoea.
- Nasal sprays such as oxymetazoline or phenylephrine, to be used as a ‘get-me-down’ should unexpected ear or sinus block occur during flight.
- Non-prescription suppositories and topical anorectal ointments/creams used to treat simple haemorrhoids.
- Topical medications including antiseptics, topical acyclovir, antifungals, weak steroid creams or benzoyl peroxide used for minor wounds and skin conditions, vaginal creams/pessaries and suppositories.

**Note:** Schedule 4 (prescription only) items such as topical antibiotics and tretinoin skin applications are not included.

- Oral Contraceptive Pill (combined OCP or mini-pill), injectable progesterone contraceptives and implantable progesterone contraceptives.
- Nicotine gum, patches or sprays used for smoking cessation.
- Steroid nasal sprays used to treat hay fever.
- Moistening or simple astringent eye drops

B. Medications requiring ground trial before DAME approval of use when flying or controlling

Pilots and ATCs taking the following medications require a ground trial (and/or AMS consultation) prior to DAME approval to fly or control:
Anaesthetics. Medical certificate holders require clearance from a medical practitioner following the administration of any anaesthetic agent:

- Minimum of 12 hours following local or regional (including dental) anaesthetics. (The condition for which the anaesthetic has been administered must also be considered prior to returning an individual to flying or controlling duties).
- Minimum of 48 hours following general, spinal or epidural anaesthetic. This proscription includes drug-induced sedation. (The condition for which the anaesthetic etc has been administered must also be considered prior to returning an individual to flying or controlling duties).

Hypnotics. Medical certificate holders should not fly or control for at least 12 hours after ingesting the sleep-inducing agent Temazepam. Medical certificate holders should not fly or control for at least 8 hours after using the sleep-inducing agent Zolpidem. Pilots and ATCs who use Temazepam or Zolpidem should not combine these drugs with alcohol. The use of the sleep-inducing agent Triazolam is not compatible with flying or controlling duties due to its potential CNS side effects. The use of Melatonin is not supported by CASA due to variation in its formulation and variability in its effects.

Antibiotics (oral and topical). Medical certificate holders may continue to undertake flying or controlling duties when taking antibiotics provided:

- the infectious condition being treated will not significantly interfere with aviation-related activities and will not be exacerbated by the specific operating environment, and
- the prescribing medical practitioner or DAME has determined there are no adverse drug reactions from the antibiotic which has been prescribed. This would normally involve a short (approximately 48 hour) ground trial or previous use of the same antibiotic.

Immunisations. Medical certificate holders should not undertake aviation-related duties for 24 hours after receiving the following vaccinations (primary and boosters):

- Adult diphtheria and tetanus
- Poliomyelitis
- Hepatitis A & B
- Measles, mumps, rubella
- Yellow fever
- Typhoid
- Tuberculosis (Mantoux Test or Bacille Calmette-Guerin);
- Influenza
- Varicella
- Meningococcal
- Pneumococcal
- Cholera.
Class 3 medical certificate holders receiving these vaccinations will usually remain fit for duty, but should consult a GP or DAME in individual cases of doubt.

After receiving the following immunisations (primary and boosters) there should be no aviation-related duties for a minimum of 72 hours:

- Japanese Encephalitis.

### Non-sedating antihistamines

### C. Medications which may be compatible with aviation duties, but which require specific assessment by CASA

For many of the following medications, it is important to note that they will be prescribed to treat particular conditions. Refer to the relevant section regarding certification requirements for that condition as well as to the issues discussed here.

CASA approval is required prior to pilots and ATCs who are taking the following classes of medications returning to flying or controlling duties:

- **Sedating Antihistamines:**
  - These should only be used when there is at least 12 hours between use and commencing aviation-related duties.

- **Antihypertensives:**
  - ACE inhibitors
  - Calcium channel blockers
  - Diuretics
  - Beta blockers.

- **Antiarrhythmics:**
  - Quinidine
  - Disopyramide
  - Verapamil
  - Amiodarone
  - Digoxin.

- **Gout medications:**
  - Allopurinol (colchicine is not usually suitable)
  - Probenecid
  - Non-steroidal anti-inflammatory medications.

- **Hypolipidemic drugs:**
  - HMG-COA reductase inhibitors
  - Gemfibrozil (gemfibrozil and statin medications are not to be used together)
  - Cholestyramine (colestipol is not suitable).
2. Medical Aspects

2.13 Medication – Drugs and Flying/Controlling

- **Ophthalmological preparations:**
  
  It is possible for patients to absorb sufficient beta-blocker through ocular administration to affect cardiovascular response to exertion/exercise.
  
  - Timolol (glaucoma)
  - Betaxolol (glaucoma).

- **Thyroid disease:**
  
  - Thyroxine requires a 14-day trial.

- **Antidepressants.**
  
  - Selected non-sedating selective serotonin reuptake inhibitors (SSRIs) require a minimum of 28 days ground trial. The underlying condition should be considered prior to returning the aviator to duty. MAOIs and tricyclic antidepressants are not generally considered compatible with aviation-related duties. (Also see section 2.6 Psychiatry.)

- **Other medications:**
  
  - Oral acyclovir or famcyclovir for genital herpes
  - Griseofulvin or terbinafine for systemic antifungal therapy requires a 28-day trial. Monthly liver function testing is required
  - Omeprazole for oesophagitis and peptic ulceration maintenance therapy, following endoscopic confirmation of ulcer healing
  - Ranitidine for peptic ulceration maintenance therapy, following endoscopic confirmation of ulcer healing
  - Clomiphene to enhance oogenesis
  - Sucralfate for non-ulcerative GI symptoms
  - Tetracycline (low dose, for long term treatment of acne)
  - Sulfasalazine for prophylaxis of well controlled ulcerative colitis
  - Sulfamethoxazole/trimethoprim for chronic urogenital tract infections.

When these classes of medications are prescribed, the following actions should be taken:

- **Ground trial:** The length of the ground trial will be determined on a case-by-case basis in consultation with CASA Aviation Medical staff, and will also depend on control of the underlying disorder and any side effects of the medication.

- **Consultation:** The DAME should contact CASA Aviation Medicine Section to discuss specific requirements for an applicant using or proposing to use any medication whose side effect profile is unknown or of possible concern.
D. Medications not acceptable for/not compatible with aviation related duties

The following medications are not compatible with aviation related duties and are never to be approved for use by a medical certificate holder without prior specific written approval by CASA.

- Narcotics
- Insulin
- Amphetamine
- Cytotoxics
- Psychotropic medications
- Anticoagulants
- Nitrates
- Complex antidiarrhoeals. Mixtures containing antispasmodics (eg, Lomotil, Imodium) are not usually compatible with aviation-related duties.

E Other medications such as vitamins, minerals and herbal preparations

Aircrew are to treat herbal medications as they would any other OTC medication. There is a potential for unforeseen consequences when taking such preparations and aircrew and ATCs should consult a DAME for advice before taking such medications and performing aviation-related duties.

Vitamins, minerals and dietary supplements

In Australia, all medicinal therapeutic products must carry an AUST L or AUST R number on the label, unless exempt. Vitamins and minerals are considered listed therapeutic goods meaning quality and safety factors have been assessed by the Therapeutic Goods Administration. In general, pilots and ATCs should not exceed the Recommended Daily Allowances for these products.

Herbal preparations

Herbal preparations are widely available in the community, and are seen by many as a “natural” alternative to conventional medicine. Unfortunately, such agents are not always subject to the same stringent regulations that apply to registered medicinal compounds as noted above. In addition, many of these preparations contain agents that may interact with other drugs and have the potential to cause side effects that are incompatible with flight safety. CASA considers routine use of herbal preparations as being incompatible with flying or controlling duties.
Herbal preparations are derived from plant parts or oils. One should bear in mind that there are no standards for quality, potency, safety or efficacy in their manufacture. Identical products may differ markedly between manufacturers or batches by the same manufacturer. Additionally, many drugs are derived from the same plants used in the herbal preparations. Therefore, many herbal preparations have the same potential side effects as manufactured drugs.

Several herbal preparations present particular threats to aviation safety, alertness, or physical well-being. Below are some of the herbal preparations known to be potentially dangerous.

- **Hallucinogens.** The following may cause hallucinations or disorientation:
  - Californian poppy
  - European mandrake
  - Kava-kava
  - Magic mushrooms
  - Nutmeg (in doses greater than a tablespoon)
  - Periwinkle
  - Thorn apple
  - Yohimbe bark.

- **Sedatives.** The following may cause drowsiness, slow reaction time, or disorientation:
  - Celandine
  - Deadly Nightshade
  - Hemlock
  - Henbane
  - Hops
  - Indian snakeroot
  - Jimson weed
  - Jin bu huan
  - Opium poppy
  - Passion flower
  - Scopolia
  - Skullcap
  - Valerian
  - Wild lettuce
  - Wolfsbane.
2.13 Medication – Drugs and Flying/Controlling

- **Cardiovascular effects.** The following may cause heart palpitations or precipitate myocardial ischaemia/infarction.
  - Broom
  - Ephedra
  - Indian snakeroot
  - Lily of the Valley
  - Pheasant’s eye
  - Purple foxglove
  - Squill
  - Stophanthus
  - White squill
  - Yellow foxglove.

- **Liver poisons.** The following may cause drowsiness, slow reaction time, or disorientation:
  - Borage
  - Chapperal
  - Colts foot
  - Comfrey
  - Germander
  - Life root
  - Thread leafed groudsel.

The DAME often lacks clinical information sufficient to be able to quantify the aeromedical risk from use of herbal preparations. The following questions will be of benefit in evaluating the safety (or otherwise) of these agents:

- Is the use of the preparation due to signs or symptoms that suggest an underlying medical problem separate from the preparation in question?
- Is any component known to have neuropsychotropic effects?
- Is the preparation likely to contain unlabelled or incorrectly labelled ingredients?
- Is the preparation being used in a dose range far outside that of current experience or in an extremely concentrated form?
- Is any component of the preparation known to cause physical harm (even infrequently, unless the quantified incidence of adverse effects is known)?
- Is the preparation an alcohol-based tincture, tonic or elixir?

If all answers are negative, it is difficult to justify prohibition of the particular agent. Any positive answers must be dealt with by education, treating the underlying condition, not endorsing the medical certificate, or referring the matter to Aviation Medicine Section at CASA.
2.14.1 Introduction

Malignancy poses a threat to flight safety for a number of reasons including:

- Direct effect(s) of the primary tumour
- Effect(s) of secondary spread
- Effect(s) of treatment modalities
- Psychological effect
- Cachexia
- Endocrine or Biochemical disturbances.

Any pilot or Air Traffic Controller (ATC) diagnosed with a malignancy must refrain from aviation or air traffic control duties until fitness to return to such duties is assessed by CASA.

However, automatic return to flying or controlling status should not be assumed. Some pilots and ATCs may be medically certificated following diagnosis and adequate treatment of their malignancy provided there is an adequate program of ongoing surveillance.

Prior to medical certification on a pilot or ATC suffering from cancer, CASA must be sure that an applicant:

- Has recovered from the primary treatment
- Has no sign of residual tumour, of tumour spread or of secondary manifestations of tumour
- Is psychologically stable enough to undertake aviation duties.

Re-certification will depend on the likelihood and type of recurrent disease and the risk that it will adversely affect flight safety.
Principles of Aeromedical Certification of Pilots/ATCs with Malignancy

When considering the aeromedical risk (and therefore the risk to aviation safety) posed by a pilot or ATC suffering from a malignancy, CASA will evaluate:

- Cancer specific issues such as:
  - The type of cancer (tissue and histological diagnosis)
  - Likelihood of recurrence
  - Site of recurrence
  - Presence of any para-neoplastic syndromes
  - Potential for a recurrence to cause overt or subtle in-flight incapacitation.

- Issues related to the treatment of the cancer.

Cancer Specific Issues

Histological variants of a particular tissue cancer may behave biologically differently from other variants. Therefore, when assessing the aeromedical risk of a pilot or ATC with a malignancy, accurate tissue diagnosis of the malignancy is essential.

Complications of the Malignancy

Potential complications of malignancy will affect CASA’s assessment of fitness for aviation related duties. Malignancy may lead to pain, wasting, neuropathy, nausea, anorexia, seizures, hypercalcaemia, hyperuricaemia, viscus obstruction, and organ failure. Some cancers have para-neoplastic syndromes associated with their presence. These syndromes result from excessive or ectopic hormones synthesized by a tumour, immune complexes, ectopic receptor production, or release of physiologically active compounds and may manifest in a variety of ways. Most para-neoplastic syndromes have serious implications for aviation safety.

Likelihood of Recurrence

Figure 1 depicts the overall survival curve for individuals diagnosed with a theoretical malignancy. For most cancer types, annual recurrence rates can be calculated from survival curves. (As cure following recurrence is rare, overall survival approximates recurrence).
2.14 Malignancy

Staging

Recurrence rates are greatly influenced by the stage of disease when primary treatment occurred. Many cancers are staged using a TNM (Tumour, Node, Metastasis) classification. Figure 2 depicts the variation in survival rates for a theoretical cancer according to the degree of spread evident at diagnosis.

Tumour Marker

Tumours may synthesize proteins that produce no clinical symptoms, eg, \( \beta \)-human chorionic gonadotropin, \( \alpha \)-fetoprotein, carcinoembryonic antigen, CA 125, and CA 153. These protein products may be used as tumour markers in the serial evaluation of patients for determining disease recurrence or response to therapy. These markers may assist CASA in assessing the suitability of a pilot or ATC to return to aviation duty, as they can often be valuable in tracking response to treatment or recurrence of disease.
Site of recurrence

Each tumour has a characteristic pattern of recurrence. Thus for a theoretical tumour, metastases might occur according to the distribution indicated in Table 1.

Table 1: Distribution of metastasis for a theoretical cancer

<table>
<thead>
<tr>
<th>Site</th>
<th>Incidence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local and lymph nodes</td>
<td>60</td>
</tr>
<tr>
<td>Liver</td>
<td>20</td>
</tr>
<tr>
<td>Lung</td>
<td>10</td>
</tr>
<tr>
<td>Bone</td>
<td>5</td>
</tr>
<tr>
<td>Bone marrow</td>
<td>3</td>
</tr>
<tr>
<td>Brain</td>
<td>2</td>
</tr>
</tbody>
</table>

Risk of particular metastasis causing incapacitation

Several assumptions are made when assessing the risk of a particular metastasis causing incapacitation (either subtle or overt). For a theoretical cancer, recurrence in a regional lymph node carries a relatively small risk of incapacitation. On the other hand, brain metastasis has a near-100% potential for incapacitation (whether sudden due to a fit or bleed, or subtle as a result of pressure effects or headache etc). Thus the incapacitation risk weighting for a theoretical cancer may be as depicted in Table 2.

Table 2: Notional risk of incapacitation from metastasis

<table>
<thead>
<tr>
<th>Site</th>
<th>Incapacitation weighting (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local and lymph nodes</td>
<td>1</td>
</tr>
<tr>
<td>Liver</td>
<td>5</td>
</tr>
<tr>
<td>Lung</td>
<td>5</td>
</tr>
<tr>
<td>Bone</td>
<td>5</td>
</tr>
<tr>
<td>Bone marrow</td>
<td>20</td>
</tr>
<tr>
<td>Brain</td>
<td>100</td>
</tr>
</tbody>
</table>

Total risk of incapacitation

From the parameters defined above, a total risk of incapacitation can be calculated:

- Recurrence rate per year for the particular stage of the malignancy
- Frequency of metastatic disease in a particular organ
- Risk that metastasis in that organ will cause incapacitation.
Thus for an early stage cancer, the result of a calculation of the risk of incapacitation from brain metastasis may be:

\[ 3\% \times 3\% \times 100\% = 0.09\% \text{ for the first year} \]

and for a late-stage cancer:

\[ 15\% \times 3\% \times 100\% = 0.45\% \text{ for the first year.} \]

In order to determine the overall risk, it is necessary to add the risks from all the possible recurrence sites.

**Treatment Related Issues**

In general, cancer is treated in one (or a combination) of the following ways:

- **Surgery** is the commonest treatment for malignant disease, and often is the only treatment. Aeromedical certification after surgery for cancer depends on the extent and success of the operation. Complications of surgery are considered on their merits, taking into account the underlying medical condition and the overall health of the affected individual.

- **Radiotherapy** is usually delivered as an intensive course. The aim may be curative, for example where an isolated group of lymph nodes have been shown to contain malignant cells, or as adjuvant therapy where lymph nodes are assumed to contain metastatic tumour. During the active part of radiotherapy treatment, pilots and ATCs will be assessed as temporarily unfit for duty. Following radiotherapy many patients suffer non-specific systemic effects, such as tiredness, malaise and nausea, which makes it inappropriate for them to partake in aviation activities at least until such effects have resolved. Occasionally there are long-term effects after radiotherapy, such as scarring, which may preclude fitness for aviation duties.

- **Chemotherapy**. During acute chemotherapy treatment (whether curative or adjuvant), pilots and ATCs will be assessed as temporarily unfit, as all chemotherapy drugs are cytotoxic, and frequently have a significant effect on normal tissue, such as rapidly dividing cells in the bone marrow. Once active chemotherapy has ceased and side effects have resolved, aeromedical certification may be possible and will be considered on a case-by-case basis. In some cases low doses of chemotherapy agents may be prescribed as maintenance therapy. Where CASA considers that such medications do not reduce aviation safety, aeromedical certification may be considered, also on a case-by-case basis.
2.14 Malignancy

- **Hormonal therapy.** Endocrine therapy is used as part of the treatment of some cancers (such as hormone and anti-hormone treatment following breast and prostate cancer). Pilots and ATCs may be returned to flying or controlling if there are no side effects from their hormonal therapy. In all cases, the decision to return to duty while on cancer chemotherapy will be made by CASA Aviation Medicine Section, on a case-by-case basis, when absence of adverse disease effects is confirmed.

- **Complementary or alternative medicine** modalities are commonly used by patients in the treatment of malignancy, particularly where the primary treatment modalities have failed to produce a cure. Where such treatments are used in the presence of continued active disease, the applicant will be assessed as unfit. Where the treatment is used to prevent onset of malignancy or recurrence, the treatment will be considered on a case-by-case basis, with regard to the individual's overall health and the potential effect of the treatment. Herbal medications are discussed in Section 2.13 Medication. All such cases should be referred to CASA Aviation Medicine Section for consideration.
2.14.2 Specific Malignancies

The commonest forms of malignant disease in the Australian pilot and ATC population are:

- Prostate cancer
- Malignant melanoma
- Bowel (colon) cancer
- Non-Hodgkin’s lymphoma
- Cancer of the testis (multiple types)
- Bladder cancer
- Kidney cancer
- Cancer of the rectum/anus
- Breast cancer
- Hodgkin’s lymphoma.

**Prostate Cancer**

Adenocarcinoma of the prostate is the commonest malignancy in men aged 50 years or more in Australia, and the incidence increases with each decade of life. Hormonal influences undoubtedly play a role in the aetiology of adenocarcinoma. Grading is based on architectural patterns and is commonly reported as the Gleason score: the primary (most prevalent) grade (1-5) plus the secondary (next most prevalent) grade (1-5); thus, it ranges from 2 (very well differentiated) to 10 (very poorly differentiated). Staging is described in Table 3.

### Table 3: Staging of prostatic cancer

<table>
<thead>
<tr>
<th>Staging System</th>
<th>Characteristics of Tumour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whitmore</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Is clinically inappropriate by palpation or imaging</td>
</tr>
<tr>
<td>T1</td>
<td>Is an incidental finding in ≤ 5% of resected tissue</td>
</tr>
<tr>
<td>T1a</td>
<td>Is an incidental finding in &gt; 5% of resected tissue</td>
</tr>
<tr>
<td>T1b</td>
<td>Is identified by needle biopsy performed for an elevated prostate-specific antigen level</td>
</tr>
<tr>
<td>T1c</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Is palpable or reliably visible on imaging; is confined to prostate</td>
</tr>
<tr>
<td>T2</td>
<td>Involved one lobe</td>
</tr>
<tr>
<td>T2a</td>
<td>Involved both lobes</td>
</tr>
<tr>
<td>T2b</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Extends through the prostatic capsule</td>
</tr>
<tr>
<td>T3</td>
<td>Has extracapsular extension (unilateral or bilateral)</td>
</tr>
<tr>
<td>T3a</td>
<td>Invades seminal vesicles</td>
</tr>
<tr>
<td>T3b</td>
<td>Is fixed or invades adjacent structures</td>
</tr>
</tbody>
</table>

AJCC = American Joint Committee on Cancer  
TNM = tumour node metastasis
Symptoms, Signs, and Diagnosis

Prostatic cancer is usually slowly progressive and may cause no symptoms. In late disease, symptoms of bladder outlet obstruction, ureteral obstruction, and hematuria may appear. Metastases to the pelvis, ribs, and vertebral bodies may cause bone pain. Carcinoma is often diagnosed incidentally when malignant changes are found in the tissue removed during surgery for suspected benign prostatic enlargement.

Elevated serum acid phosphatase or Roy test (an enzymatic method) correlates well with the presence of metastatic prostate cancer, particularly in lymph nodes. Although acid phosphatase and Prostatic Specific Antigen (PSA) levels decline after treatment and rise with recurrence, PSA is the more sensitive marker for monitoring cancer progression and response to therapy. However, because serum PSA is moderately elevated in 30 to 50% of patients with benign prostatic hyperplasia (depending on prostate size and degree of obstruction) and in 25 to 92% of those with prostate cancer (depending on tumour volume), its role in early detection and staging is unclear. Significantly elevated PSA levels suggest extracapsular extension of tumour or metastases.

Prognosis and Treatment

Long-term local control - even cure - is possible. However, the potential for cure, even in patients with clinically localized cancer, depends on factors such as grade, stage, and pretreatment PSA level. For patients with low-grade, organ-confined tumours, survival is virtually identical to that for age-matched controls without prostate cancer.

Most patients elect to undergo definitive therapy with radical prostatectomy or radiotherapy. Radical prostatectomy is probably optimal for younger patients with longer life expectancy; they have the lowest risk of urinary incontinence. Radiotherapy may offer comparable results, especially in patients with low pretreatment PSA levels.

An asymptomatic patient with a locally advanced tumour or metastases may benefit from hormonal therapy with or without adjuvant radiotherapy. Hormonal therapy rarely uses exogenous estrogens, which pose an increased risk of cardiovascular and thromboembolic complications.

Medical Certification

Cancer of the prostate has a generally good prognosis, and tends to metastasise locally or to bone. Once primary treatment has been completed, certification will be possible where:

- There is no evidence of metastatic spread
- PSA has returned to normal
- There are no significant consequences of treatment, such as incontinence.

Certification will be for no more than 12 months. Each CASA medical examination and report must be accompanied by a progress report from a urologist or oncologist, and a recent PSA level. If the applicant shows no signs of recurrence after 5 years from initial diagnosis, no further follow up is required. Provided no other medical conditions preclude it, there can be a return to regular certification procedures for age and Class.
Malignant Melanoma

Malignant melanoma is the second commonest malignancy in the Australian aircrew and ATC population. The incidence is rising. Sun exposure is a risk, as is family history and the occurrence of lentigo maligna, large congenital melanocytic naevus, and the dysplastic naevus syndrome.

About 40 to 50% of malignant melanomas develop from pigmented moles. Almost all of the rest arise from melanocytes in normal skin. Signs of malignant transformation should be carefully sought: change in size; change in color, especially spread of red, white, and blue pigmentation to surrounding normal skin; change in surface characteristics, consistency, or shape; and signs of inflammation in surrounding skin, with possible bleeding, ulceration, itching, or pain.

Malignant melanomas vary in size, shape, and color (usually pigmented) and in their propensity to invade and metastasize. This neoplasm may spread rapidly, causing death within months of its recognition, yet the 5-yr cure rate of early, very superficial lesions is nearly 100%. Cure depends on early diagnosis and early treatment. The major types of malignant melanoma are:

- Lentigo maligna melanoma
- Superficial spreading melanoma: accounts for 2/3 of malignant melanomas
- Nodular melanoma: constitutes 10 to 15% of malignant melanomas.
Prognosis and Treatment

Two classification systems are useful for evaluating melanomas:

- melanoma thickness as measured from the granular layer of the epidermis to the greatest depth of tumour invasion, as described by Breslow, and
- anatomic level of invasion, as described by Clark. In Clark's classification, level I is confined to epidermis; level II extends into papillary dermis; level III extends further into papillary dermis, with expansion of this layer; level IV extends into reticular dermis; and level V extends into subcutaneous fat.

Increased Breslow thickness and deeper invasion (Clark level) correlate with poorer prognosis. The clinical type of tumour is less important to survival than the thickness of the tumour at the time of diagnosis.

Metastatic spread of melanoma occurs both via lymphatics and blood vessels. Local spread results in formation of nearby satellite papules or nodules that may or may not be pigmented. Direct metastasis to skin or internal organs may occur, and occasionally metastatic nodules or enlarged lymph nodes are discovered before the primary lesion is identified. Melanomas arising from mucous membranes have a very poor prognosis, although they often seem quite limited when discovered.

Treatment is by surgical excision. Although the width of margins is debated, most experts agree that a 1-cm lateral tumour-free margin is adequate for lesions < 1 mm thick. Thicker lesions may deserve more radical surgery and sentinel node biopsy.

Thick malignant melanomas and regional or distant metastasis may be treated with chemotherapy. Prognosis is poor.

Table 4: Five-year survival for malignant melanoma

<table>
<thead>
<tr>
<th>Tumour Thickness (mm) *</th>
<th>5-Yr Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76</td>
<td>98 - 100</td>
</tr>
<tr>
<td>0.76 - 1.5</td>
<td>90 - 94</td>
</tr>
<tr>
<td>1.51 – 2.25</td>
<td>83 – 84</td>
</tr>
<tr>
<td>2.26 – 3.0</td>
<td>72 – 77</td>
</tr>
<tr>
<td>&gt; 3.0</td>
<td>46</td>
</tr>
</tbody>
</table>

* Tumour thickness is very difficult to assess if histological signs of regression are present.
Aeromedical Certification

Following diagnosis of a malignant melanoma, CASA will not certificate a pilot or ATC for the first 12 months because of the risk of spread to organs such as the brain, lungs or bone. The associated risk of incapacitation is significant.

**Class 2:** In the absence of recurrence, CASA will usually approve Class 2 certification as follows:

<table>
<thead>
<tr>
<th>Tumour thickness</th>
<th>Certification</th>
<th>Period post-diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76 mm</td>
<td>Unrestricted</td>
<td>12 months</td>
</tr>
<tr>
<td>0.76 – 1.49 mm</td>
<td>Unrestricted</td>
<td>12 months</td>
</tr>
<tr>
<td>1.5 – 2.24 mm</td>
<td>Unrestricted</td>
<td>12 months</td>
</tr>
<tr>
<td>2.25 – 3.0 mm</td>
<td>Restricted</td>
<td>24 months</td>
</tr>
<tr>
<td></td>
<td>Unrestricted</td>
<td>36 months</td>
</tr>
<tr>
<td>&gt; 3.0 mm</td>
<td>Restricted</td>
<td>48 months</td>
</tr>
<tr>
<td></td>
<td>Unrestricted</td>
<td>60 months</td>
</tr>
</tbody>
</table>

**Class 1 and 3:** In the absence of recurrence, CASA will usually approve Class 1 and 3 certification as follows:

<table>
<thead>
<tr>
<th>Tumour thickness</th>
<th>Certification</th>
<th>Period post-diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76 mm</td>
<td>Unrestricted</td>
<td>12 months</td>
</tr>
<tr>
<td>0.76 – 1.49 mm</td>
<td>Restricted</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Unrestricted</td>
<td>24 months</td>
</tr>
<tr>
<td>1.5 – 2.24 mm</td>
<td>Restricted</td>
<td>24 months</td>
</tr>
<tr>
<td></td>
<td>Unrestricted</td>
<td>36 months</td>
</tr>
<tr>
<td>2.25 – 3.0 mm</td>
<td>Restricted</td>
<td>36 months</td>
</tr>
<tr>
<td></td>
<td>Unrestricted</td>
<td>60 months</td>
</tr>
<tr>
<td>&gt; 3.0 mm</td>
<td>Restricted</td>
<td>48 months</td>
</tr>
<tr>
<td></td>
<td>Unrestricted</td>
<td>72 months</td>
</tr>
</tbody>
</table>

Certification will be for no more than 12 months, and renewal medical examinations and reports must be accompanied by a progress report from the treating dermatologist or oncologist. These reports will be required for at least 3 years following return to unrestricted duties.
Colorectal (Bowel) Cancer

In Western countries, cancers of the colon and rectum account for more new cases of cancer per year than cancer of any other anatomical site except the lung. Colorectal cancer is the most frequent cause of death from visceral malignancies that affect both sexes. The incidence of this condition begins to rise at age 40 and peaks at age 60 to 75 years. Colorectal cancer spreads by direct extension through the bowel wall, haematogenous metastasis, regional lymph node metastasis, perineural spread, and intraluminal metastasis.

Symptoms, Signs, and Diagnosis

Adenocarcinoma of the colon and rectum grows slowly, and a long interval elapses before it is large enough to produce symptoms. Early diagnosis depends on routine examination. Symptoms depend on the lesion's location, type, extent, and complications. In cancer of the rectum, the commonest presenting symptom is bleeding with defaecation. Whenever rectal bleeding occurs, even with obvious haemorrhoids or known diverticular disease, coexisting cancer must be excluded. Simple, inexpensive testing of the stool for occult blood is advised as part of both screening and high-risk surveillance programs.

Elevated serum carcinoembryonic antigen (CEA) is not specifically associated with colorectal cancer, but levels are high in 70% of affected patients. If CEA is high preoperatively, and low after removal of a colon tumour, monitoring CEA may help to detect recurrence.

Treatment and Prognosis

Primary treatment consists of wide surgical resection of the colon cancer and regional lymphatic drainage. The choice of operation for rectal cancer depends on the tumour's distance from the anus and gross extent. Abdominoperineal resection of the rectum requires a permanent sigmoid colostomy. Surgical cure is possible in 70% of patients. The best 5-yr survival rate for cancer limited to the mucosa approaches 90% (stage I, Dukes’ A); with penetration of the muscularis propria, 80% (stage II, Dukes’ B); with positive lymph nodes, 30% (stage III, Dukes’ C).

Medical Certification

Issues dealing with colostomy and ileostomy are found in Section 2.9 Gastroenterology.

Following diagnosis of a bowel cancer, CASA will not usually certificate a pilot or ATC for the first 12 months because of the risk of spread to organs such as the brain, lungs or bone and the associated risk of incapacitation is significant. CASA will require the following information when considering the fitness of a pilot or ATC to return to aviation-related duties following the diagnosis of colorectal cancer: an annual report from the treating gastroenterologist and/or oncologist, including tissue diagnosis, staging and CEA level, for at least 5 years post-diagnosis.
In the absence of recurrence, CASA will usually approve certification as follows:

**Stage III**

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Certification Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with copilot/no solo controlling</td>
<td>36 months</td>
</tr>
<tr>
<td>Unrestricted</td>
<td>60 months</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with copilot/no solo controlling</td>
<td>12 months</td>
</tr>
<tr>
<td>Unrestricted</td>
<td>36 months</td>
</tr>
</tbody>
</table>

**Stage II**

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with copilot/no solo controlling</td>
<td>24 months</td>
</tr>
<tr>
<td>Unrestricted</td>
<td>36 months</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrestricted</td>
<td>12 months</td>
</tr>
</tbody>
</table>

**Stage I**

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with copilot/no solo controlling</td>
<td>12 months</td>
</tr>
<tr>
<td>Unrestricted</td>
<td>24 months</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrestricted</td>
<td>12 months</td>
</tr>
</tbody>
</table>

**Non-Hodgkin’s Lymphoma**

Non-Hodgkin’s Lymphoma is a malignant monoclonal proliferation of lymphoid cells in sites within the immune system, including lymph nodes, bone marrow, spleen, liver, and gastrointestinal tract. Pathological classification of non-Hodgkin's lymphomas (NHL) is evolving, reflecting new insights into the cells of origin and the biological bases of these heterogeneous diseases. The course of NHL varies from indolent and initially well tolerated to rapidly fatal.

**Incidence and Aetiology**

NHL occurs more often than Hodgkin's disease. Its cause is unknown, although, as with the leukaemias, substantial experimental evidence suggests a viral cause for some lymphomas. Primary CNS involvement and disseminated disease occur. In about 30% of cases, the lymphomas are preceded by generalized lymphadenopathy.
Pathology

The Working Formulation classifies NHL into prognostic categories having therapeutic implications as follows:

- **Low-grade lymphomas** (38%): Diffuse, small lymphocytic; follicular, small-cleaved cell; follicular mixed, small and large cell.

- **Intermediate-grade lymphomas** (40%): Follicular large cell; diffuse, small-cleaved cell; diffuse mixed, small and large cell; diffuse large cell.

- **High-grade lymphomas** (20%): Immunoblastic lymphoma; lymphoblastic lymphoma; small noncleaved cell lymphoma (Burkitt's and non-Burkitt's types).

- **Miscellaneous lymphomas** (2%): Composite lymphomas; mycosis fungoides; true histiocytic; other, and unclassifiable types.

Symptoms and Signs

Although various clinical manifestations of NHL occur, many patients present with asymptomatic peripheral lymphadenopathy. Enlarged lymph nodes are rubbery and discrete and later become matted. Local disease is apparent in some patients, but most have multiple areas of involvement. Anaemia is initially present in about 33% of patients and eventually develops in most.

Staging

Localised NHL does occur, but the disease is disseminated when first recognized in about 90% of follicular lymphomas and 70% of diffuse lymphomas. The final staging of NHL is similar to that of Hodgkin's disease; however, it is more often based on clinical than pathological findings.

Table 5: Ann Arbor Staging of Hodgkin's Disease and Non-Hodgkin's Lymphoma

<table>
<thead>
<tr>
<th>Stage *</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>In one lymph node only</td>
</tr>
<tr>
<td>II</td>
<td>In two or more lymph nodes on the same side of the diaphragm</td>
</tr>
<tr>
<td>III</td>
<td>In the lymph nodes, spleen, or both and on both sides of the diaphragm</td>
</tr>
<tr>
<td></td>
<td>1 Above the renal vessels (eg, spleen; splenic, hilar, coeliac and portal nodes)</td>
</tr>
<tr>
<td></td>
<td>2 In the lower abdomen (periaortic, pelvic, or inguinal nodes)</td>
</tr>
<tr>
<td>IV</td>
<td>Extranodal involvement (eg, bone marrow, lung, liver)</td>
</tr>
</tbody>
</table>

*Subclassification E indicates extranodal involvement adjacent to an involved lymph node (eg, disease of mediastinal nodes and hilar adenopathy with adjacent lung infiltration is classified as stage IIE). Stages can be further classified by A to indicate the absence; or B to indicate the presence of constitutional symptoms (weight loss, fever, or night sweats). B symptoms generally occur with stages III and IV (20 to 30% of patients).
Initially, constitutional symptoms tend to be less common in NHL than in Hodgkin's disease and do not usually alter prognosis. Organ infiltration is more widespread in NHL, and the bone marrow and peripheral blood may be involved.

**Prognosis and Treatment**

The histopathology, stage of disease, and results of surface marker studies significantly influence the prognosis and response to treatment. Patients with T-cell lymphomas generally have a worse prognosis than those with B-cell types. Other factors that adversely affect prognosis are poor performance status, age > 60 years, elevated LDH level, bulky tumour masses (diameter > 10 cm), and more than two extranodal sites of disease.

A prognostic index for diffuse mixed, diffuse large cell, and immunoblastic lymphomas has been reported. The International Prognostic Index (IPI) considers five categories: age, performance status, LDH level, number of extranodal sites, and stage. Prognostic groups of low, low intermediate, high intermediate, and high risk may be defined.

A cure may be expected in 30 to 50% of affected patients with intermediate- and high-grade lymphomas undergoing myeloablative therapy. In low-grade lymphomas, it remains uncertain whether cure may be obtained with transplantation, although their survival rate is better than that of patients receiving secondary palliative therapy alone.

**Medical Certification**

Without a complete remission, return to aviation duties will not usually be considered. Once in remission, certification will usually be conducted on a case-by-case basis, using the following table as a guide. The high rate of late recurrence limits the likelihood of an unrestricted Class 1 or Class 3 certification.
2. Medical Aspects

2.14 Malignancy

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Class 1 &amp; 3 unrestricted</th>
<th>Class 1 &amp; 3 restricted</th>
<th>Class 2 unrestricted</th>
<th>Class 2 restricted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>5 years</td>
<td>4 years</td>
<td>3 years</td>
<td>2 years</td>
</tr>
<tr>
<td>Low - intermediate</td>
<td>6 years</td>
<td>5 years</td>
<td>4 years</td>
<td>3 years</td>
</tr>
<tr>
<td>High - intermediate</td>
<td>-</td>
<td>5 years</td>
<td>4 years</td>
<td>3 years</td>
</tr>
<tr>
<td>High</td>
<td>-</td>
<td>-</td>
<td>6 years</td>
<td>4 years</td>
</tr>
</tbody>
</table>

Applications for renewal of a medical certificate must be accompanied by a progress report from the treating haematologist or oncologists detailing treatment, prognosis and current health. Certification will be for a maximum of 12 months until at least 5 years post-recertification, and at least 3 years following return to unrestricted duties.

**Hodgkin’s Disease**

Hodgkin’s Disease is a localised or disseminated malignant proliferation of tumour cells arising from the lymphoreticular system, primarily involving lymph node tissue and bone marrow.

**Incidence and Aetiology**

Hodgkin’s disease has a bimodal age distribution that peaks at ages 15 to 34 and after age 60. However, the second peak may be an artefact of inaccurate diagnosis, because most cases diagnosed after age 60 are intermediate-grade non-Hodgkin’s lymphomas.

**Pathology**

Diagnosis depends on identification of Reed-Sternberg cells (large binucleated cells) in lymph nodes or at other sites.

**Table 7: Histopathological Subtypes of Hodgkin’s Disease**

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance</th>
<th>Incidence</th>
<th>Progression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lymphocyte predominant</td>
<td>Few Reed-Sternberg cells and many lymphocytes</td>
<td>3%</td>
<td>Relatively slow or indolent</td>
</tr>
<tr>
<td>Nodular sclerosis</td>
<td>Dense fibrous tissue* surrounds nodules of Hodgkin’s tissue</td>
<td>67%</td>
<td>Intermediate or moderately progressive; relatively slow or indolent (occasionally)</td>
</tr>
<tr>
<td>Mixed cellularity</td>
<td>A moderate number of Reed-Sternberg cells with a mixed background infiltrate</td>
<td>25%</td>
<td>Intermediate or moderately progressive; aggressive</td>
</tr>
<tr>
<td>Lymphocyte-depleted</td>
<td>Numerous Reed-Sternberg cells and extensive fibrosis</td>
<td>5%</td>
<td>Aggressive</td>
</tr>
</tbody>
</table>

* Shows characteristic birefringence with polarised light
Symptoms and Signs

Symptoms and signs primarily relate to the site, amount, and extent of nodal mass involvement. Most patients present with cervical and mediastinal adenopathy and without systemic complaints. Other manifestations develop as the disease spreads through the reticuloendothelial system, generally among contiguous sites. The rate of progression varies according to histopathological subtype.

Diagnosis

Hodgkin's disease can be definitively diagnosed by lymph node biopsy that reveals Reed-Sternberg cells in a characteristic histological setting. Hodgkin's disease may be difficult to differentiate from lymphadenopathy caused by infectious mononucleosis, toxoplasmosis, cytomegalovirus, NHL, or leukaemia.

Staging

Radiotherapy, chemotherapy, or a combination of both is potentially curative, but the extent or stage of disease must first be determined. The Ann Arbor staging system (see Non-Hodgkin's Lymphoma) is commonly used.

Treatment

Chemotherapy or radiotherapy regimens cure most patients.

- **Stage I and IIA disease** can be treated with radiotherapy. Such treatment cures about 80% of patients. Cure refers to being disease-free at 5 years post-therapy, after which relapse is very rare.

- For **stage IIIA1 disease**, total nodal irradiation results in an overall survival of 85 to 90%, with disease-free survival of 65 to 75% at 5 years.

- For **stage IIIA2 disease**, combination chemotherapy is generally used with or without radiotherapy of bulky nodal sites. Cure rates of 75 to 80% have been achieved.

- Because radiotherapy alone does not cure **stage IIIB disease**, combination chemotherapy alone or in conjunction with radiotherapy is required. Survival ranges from 70 to 80% (at 5 years).

- For **stage IVA and B disease**, combination chemotherapy has produced a complete remission in 70 to 80% of patients, with > 50% remaining disease-free at 10 to 15 years. Patients who fail to achieve complete remission or who relapse within 6 to 12 months have a poor prognosis.
Medical Certification

CASA will not usually consider certification until at least 12 months following successful treatment. “Successful treatment” requires that the disease be in complete remission. The following table provides guidance on the likely time before CASA will consider certification, following diagnosis, assuming that there are no other significant health issues, no side effects from the treatment and ongoing complete remission or “cure” has been effected. All renewal medical examinations and reports must be accompanied by a progress report from the treating haematologist or oncologist.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Class 1 &amp; 3 unrestricted</th>
<th>Class 1 &amp; 3 restricted</th>
<th>Class 2 unrestricted</th>
<th>Class 2 restricted</th>
</tr>
</thead>
<tbody>
<tr>
<td>I and IIA</td>
<td>5 years</td>
<td>4 years</td>
<td>3 years</td>
<td>2 years</td>
</tr>
<tr>
<td>IIIA1</td>
<td>6 years</td>
<td>5 years</td>
<td>4 years</td>
<td>3 years</td>
</tr>
<tr>
<td>IIIA2</td>
<td>6 years</td>
<td>5 years</td>
<td>4 years</td>
<td>3 years</td>
</tr>
<tr>
<td>IIIB and IV</td>
<td>-</td>
<td>-</td>
<td>6 years</td>
<td>5 years</td>
</tr>
</tbody>
</table>

Testicular Cancer

Testicular tumours account for most solid tumours in males aged less than 30 years. Malignant testicular tumours arise from the primordial germ cell and differentiate to reveal seminoma, teratoma, embryonal carcinoma, endodermal sinus tumour (yolk sac tumour), and choriocarcinoma.

Symptoms, Signs, and Diagnosis

The usual presenting sign is a scrotal mass, sometimes associated with pain. Many patients discover the mass in association with minor trauma. Haemorrhage into the tumour may produce local pain and tenderness. Any firm mass in the testis is cause for immediate clinical suspicion of testicular tumour. Diagnostic studies should include radioimmunoassays for α-fetoprotein and β-human chorionic gonadotropin. These markers, when elevated, indicate the presence of tumour; they are also valuable in follow-up of patients with proven testicular tumours, especially the nonseminomatous types.

Prognosis and Treatment

Prognosis depends on the histology and extent of the tumour. Survival rates are > 95% at 5 years for seminomas and nonseminomas localized to the testis or low-volume metastases in the retroperitoneum. The 5-year survival rate for extensive retroperitoneal metastases or pulmonary or other visceral metastases is poorer and varies with site, volume, and histology of the metastases.
Radical (inguinal) orchidectomy, the cornerstone of treatment, provides important histopathological information for planning further therapy. These parameters can accurately predict the risk of occult lymph node metastases; so low-risk patients with normal x-rays and biomarkers may be candidates for surveillance protocols, especially patients with nonseminomatous germ cell tumours rather than seminomas. Otherwise, standard treatment for seminoma is irradiation after unilateral orchidectomy. For nonseminomatous germ cell tumours, standard treatment is retroperitoneal lymph node dissection.

Medical Certification

Stage 1 (non-metastatic disease): Terratoma with orchidectomy only. Following recovery from the surgery, unrestricted Class 1, 2 or 3 is usual. For the first 24 months, certification is for 6 months at a time. Each medical is to be accompanied by a report from urologist or oncologist, along with tumour marker levels. Tumour markers will usually rise before any anatomical disease is identifiable. After two years without recurrence, this can increase to 12 monthly certification, until 5 years post-diagnosis.

Seminoma with orchidectomy only. There is a 15% relapse rate. This is usually monitored by serial CT or MRI scans. Unrestricted Class 1 or 3 certification will be delayed for 24 months post-surgery. Restricted Class 1 and 3 and unrestricted Class 2 is possible from recovery after surgery. Certification will be for 6 months for the first two years, then annual until 5 years post-diagnosis.

Seminoma with orchidectomy and radiotherapy. As the cure rate is greater than 99%, unrestricted Class 1, 2 and 3 certification is possible as soon as the individual has recovered from the primary treatment. Certification again will be for 6 months for the first 2 years, then annual, and the medical must be accompanied by a progress report from the treating urologist or oncologist.

Stage II/III (local metastatic disease): The prognosis remains good compared with most other malignancies.

<table>
<thead>
<tr>
<th>Class</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 restricted</td>
<td>Following recovery from primary treatment and</td>
</tr>
<tr>
<td>2 unrestricted</td>
<td>6 months following successful treatment</td>
</tr>
<tr>
<td>1/3 restricted</td>
<td>12 months following successful treatment</td>
</tr>
<tr>
<td>1/3 unrestricted</td>
<td>24 months following successful treatment</td>
</tr>
</tbody>
</table>

Renewal medical examinations and reports must be accompanied by a progress report from the treating specialist.
Stage IV (disseminated disease): Although 5-year survival is around 60-70%, this outcome is usually achieved only by prolonged chemotherapy. While chemotherapy is required, there will be no certification.

<table>
<thead>
<tr>
<th>Class</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 2 restricted</td>
<td>24 months after last treatment and continued disease free</td>
</tr>
<tr>
<td>Class 2 unrestricted</td>
<td>36 months following successful treatment</td>
</tr>
<tr>
<td>Class 1/3 restricted</td>
<td>36 months following successful treatment</td>
</tr>
<tr>
<td>Class 1/3 unrestricted</td>
<td>No certification</td>
</tr>
</tbody>
</table>

Renewal medical examinations and reports must be accompanied by a progress report from the treating specialist.

Other Malignancies

This chapter is not intended to provide detailed advice for all possible malignancies. Other malignancies may be discussed in the relevant organ system chapter of this *Handbook*. Otherwise, the guiding principles outlined above should be used. Where doubt exists, discussion with, or referral to, CASA Aviation Medicine Section should be undertaken immediately.
2.15 Differences between Australian Medical Certification and ICAO Medical Certification for International Operations

2.15.1 Currency of Medical Certification

ICAO commences periods of currency from the date of the medical examination, not from the date of CASA’s assessment nor from the applicant’s anniversary date. As an aide-memoire to applicants, CASA’s medical certificates record the date on which the applicant's most recent medical examination was performed, to assist calculation of the medical certificate's currency for ICAO purposes. (See the Note below.)

2.15.2 Duration of Medical Certification

Class 1 medical certificates

For applicants with ATPL who are aged 40 years or more, ICAO demands a medical examination by a DAME every six months. That is, the currency of medical certification for this group extends for only six months from the date of the most recent medical examination.

Class 2 medical certificates

ICAO demands a medical examination by a DAME every two years for all Class 2 medical certificate holders. That is, the currency of medical certification for this group extends for only two years from the date of the most recent medical examination.

As an aide-memoire to applicants, CASA’s medical certificates record the date on which the applicant's most recent medical examination was performed, to assist calculation of the medical certificate's currency for ICAO purposes. (See the Note below.)

**Note:** This has no effect on the notified currency of medical certificates when exercising licence privileges within Australian airspace.

This advice is provided to all Class 1 or Class 2 medical certificate holders whenever a CASA medical certificate is issued.
3.1.1 Questions to be Asked of CASA Employees for Superannuation Medicals

The following are questions to be asked during Superannuation Medicals (Class 3 Medical Certificate holders and pilots to be employed by CASA).

1. Have you ever been rejected:
   a. As a risk for life insurance?
   b. For admission to any employment for health reasons?
   c. For entry into any superannuation scheme?

2. Have you ever been retired or have your services ever been terminated from any employment on medical or invalidity grounds?

3. Are you receiving, or have you ever received:
   a. A pension or any other benefit from the Commonwealth Superannuation Scheme, the Defence Force Retirement and Death Benefits Scheme, or any other government or private superannuation scheme?
   b. Workers’ or employees’ compensation?
   c. A Social Security invalidity pension or sickness benefit?
   d. A Repatriation service pension?
   e. A Repatriation disability pension? If so, please state award rate.
4. Aviation Medicine Telephone Numbers and Addresses
4.1 Telephone List

4.1.1 Aviation Medicine Telephone Contact as at December 2000

<table>
<thead>
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<th>CASA National Office (at the cost of a local telephone call)</th>
<th>131 757</th>
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<tr>
<td>Inquiries</td>
<td>(02) 6217 1641</td>
</tr>
<tr>
<td>Facsimile</td>
<td>(02) 6217 1640</td>
</tr>
</tbody>
</table>
4.2 CASA Offices

4.2.1 Head Office

Aviation Medicine Section
Cnr Barry Drive & Northbourne Avenue
CANBERRA ACT 2601

GPO Box 1544
CANBERRA CITY ACT 2601

4.2.2 Area Offices

<table>
<thead>
<tr>
<th>Office</th>
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<th>Phone Number</th>
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<tbody>
<tr>
<td>Sydney Basin</td>
<td>PO Box CPS Condell Park</td>
<td>(02) 97803050</td>
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<tr>
<td></td>
<td>NSW 2200</td>
<td></td>
</tr>
<tr>
<td>NT and Kimberleys</td>
<td>PO Box 41196 Casuarina</td>
<td>(08) 89432999</td>
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<td></td>
<td>NT 0811</td>
<td></td>
</tr>
<tr>
<td>South Queensland</td>
<td>39 Navigator Place Hendra</td>
<td>(07) 3632 4051</td>
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<tr>
<td></td>
<td>Qld 4051</td>
<td></td>
</tr>
<tr>
<td>North Queensland</td>
<td>PO Box 7740 Garbutt Qld 4814</td>
<td>(07) 4750 2671</td>
</tr>
<tr>
<td>NSW Country Office</td>
<td>GPO Box 2005 Canberra</td>
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<tr>
<td>Victoria Tasmania</td>
<td>PO Box 20 Moorabbin VIC 3189</td>
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<tr>
<td>Central</td>
<td>PO Box 126 PBC Adelaide</td>
<td>(08) 8422 2904</td>
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<td></td>
<td>SA 5950</td>
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<tr>
<td>West Australia</td>
<td>GPO Box 1082 CLOVERDALE</td>
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<td></td>
<td>WA 6105</td>
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</table>
## 5.1 Locations for Colour Vision Testing

### 5.1.1 Locations by State

| Australian Capital Territory | Dr D Batagol  
Dickson Park Professional Centre  
Unit 5, Cnr Cowper and Antill Street  
DICKSON ACT 2602  
Tel: (02) 6249 7177 |
|-----------------------------|----------------------------------------------------------|
| New South Wales             | School of Optometry  
Ms Kerry Dreyer  
University of New South Wales  
KENSINGTON NSW 2033  
Tel: (02) 9385 4624 or (02) 9385 4628  
Dr P Duke  
135 Macquarie Street  
SYDNEY NSW 2000  
Tel: (02) 9247 3557 |
| Northern Territory          | Dr M I Mahmood  
Darwin Private Hospital  
Rocklands Drive  
CASUARINA NT 0810  
Tel: (08) 8920 6049 |
| Queensland                  | Optometry Clinic, School Of Optometry  
O Block Kelvin Grove Campus  
Victoria Park Road  
KELVIN GROVE QLD 4059  
Tel: (07) 3864 5739  
Please specify on making an appointment, an "Aviation Colour Vision Test" to be supervised by Miss J Bevan.  
Dr W Talbot  
14 Fulham Rd  
PIMLICO TOWNSVILLE QLD 4812  
Tel: (07) 4775 1633 |
### 5. Colour Vision Testing

#### 5.1 Locations for Colour Vision Testing

<table>
<thead>
<tr>
<th>Region</th>
<th>Contact Information</th>
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</thead>
</table>
| Queensland (cont.) | Captain Henry Thein (Northern Ports)  
Marine Operations, Queensland Transport  
64-66 Tingira Street  
PORTSMITH CAIRNS QLD 4870  
Tel: (07) 4052 7400  
Fax: (07) 40351127 |
| South Australia | Dr J L Crompton  
22 Walter Street  
NORTH ADELAIDE SA 5006  
Tel: (08) 8267 3211 |
| Tasmania         | Defence Forces  
Recruiting Medical Section  
Anglesea Barracks, Davie Street  
HOBART TAS 7000  
Tel: (03) 6237 7327 |
| Victoria         | Victorian College of Optometry  
374 Cardigan St  
CARLTON VIC 3053  
Tel: (03) 9349 7400  
**Note:**  
Please state “Aviation Colour Vision Test” when making an appointment  
– to be supervised by Kay Lian  
Dr J Parkes  
54 Station Place  
SUNSHINE VIC 3020  
Tel: (03) 9312 0800 |
| Western Australia | Ms Lisa Biggs  
Lincoln House  
Suite No3  
No4 Ventnor Avenue  
WEST PERTH WA 6005  
Tel: (08) 9485 1440 |
### 6. Aviation Medicine Forms

#### 6.1 Form Details and Availability

**6.1.1 List of Forms**

<table>
<thead>
<tr>
<th>Former Form No.</th>
<th>New CASA Form No.</th>
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<td>AVM 010</td>
<td>093</td>
<td>Authority Audiogram</td>
<td>J.S. McMillan</td>
</tr>
<tr>
<td>AVM 011</td>
<td>094</td>
<td>ECG</td>
<td>Phone: 02 9795 1222 (Australia) +61 2 9795 1222 (International)</td>
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<td>AVM 006</td>
<td>097</td>
<td>Medical Questionnaire and Examination Form—R</td>
<td>P.O Box 136 Regents Park NSW 2143</td>
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<td>Medical Questionnaire and Examination Form—O</td>
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<td>Eye Examination Report—V</td>
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<tr>
<td>AVM 005</td>
<td>172</td>
<td>Medical Certificate</td>
<td>Aviation Medicine Section, Canberra</td>
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<td>AVM 008</td>
<td>755</td>
<td>Application for Appointment or Re-appointment as Designated Aviation Medical Examiner or Designated Aviation Ophthalmologist (under Regulation 6.02 of the Civil Aviation Regulations)</td>
<td>The CASA website</td>
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6. Aviation Medicine Forms
6.1 Form Details and Availability

Approved by Assistant Director, Aviation Safety Standards  Version 3.0: December 2003

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BODY MASS INDEX CHART

Weight For Height Chart
(For Men and Women from 18 years onward)

Based on Body Mass Index (BMI) in Range of 18, 20, 25, 30.

BMI = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}
1. Revision History
Coronary Heart Disease

Risk Factor Prediction Chart

1. Find Points for each Risk Factor

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<tr>
<th>Age (if Female)</th>
<th>Age (if Male)</th>
<th>HDL Cholesterol</th>
<th>Total Cholesterol</th>
<th>Systolic Blood Pres</th>
<th>Other</th>
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<td>HDL-C Pts</td>
<td>Total-C Pts</td>
<td>SPB Pts</td>
<td>Others Pts</td>
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<td>5 30 -2 57-59</td>
<td>0.65-0.68 7</td>
<td>3.60-3.99 -3</td>
<td>98-104 -2</td>
<td>Cigarettes 4</td>
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<td>6 31 -1 60-61</td>
<td>0.69-0.76 6</td>
<td>4.00-4.30 -2</td>
<td>105-112 -1</td>
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<tr>
<td>32 -9 51-52</td>
<td>7 32-33 0 62-64</td>
<td>0.77-0.84 5</td>
<td>4.31-4.69 -1</td>
<td>113-120 0</td>
<td>Diabetic (F) 6</td>
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<tr>
<td>33 -8 53-55</td>
<td>8 34 1 65-67</td>
<td>0.85-0.90 4</td>
<td>4.70-5.19 0</td>
<td>121-129 1</td>
<td>ECG-LVH 9</td>
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<tr>
<td>34 -6 56-60</td>
<td>9 35-36 2 68-70</td>
<td>0.91-0.99 3</td>
<td>5.20-5.69 1</td>
<td>130-139 2</td>
<td>(0 pts for each NO)</td>
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<tr>
<td>35 -5 61-67</td>
<td>10 37-38 3 71-73</td>
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<td>11 39 4 74 19</td>
<td>1.10-1.19 1</td>
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<td>6 1.31-1.43 -1</td>
<td>7.50-8.19 5</td>
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<td>7 1.44-1.56 -2</td>
<td>8.20-8.55 6</td>
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<td>8 1.57-1.70 -3</td>
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<tr>
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<td>11 2.08-2.25 -6</td>
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<td>45-46 4</td>
<td>12 55-56 2.26-2.49 -7</td>
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</table>

2. Sum Points for all Risk Factors

Age ( ) + (HDL-C ( ) = Total-C ( ) + SBP ( ) + Smoker ( ) + Diabetes ( ) + ECG-LVH ( ) Point Total

NOTE: Minus points subtract from total

3. Look up risk corresponding to point total

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<tr>
<th>Probability (%)</th>
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<td>8 16 28 19 33 30-34</td>
<td>&lt;1 3</td>
<td>2 1 11 3 20 8</td>
<td>18 29 20 36 35-39</td>
<td>&lt;1 5</td>
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<tr>
<td>3 1 2 12 3 7 21 9</td>
<td>9 19 30 22 38 40-44</td>
<td>2 6</td>
<td>4 1 13 3 22 11</td>
<td>21 31 24 40 45-49</td>
<td>5 10</td>
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<tr>
<td>5 1 3 14 4 9 23 12 23</td>
<td>32 25 42 50-54</td>
<td>8 14</td>
<td>6 1 15 5 24 13</td>
<td>25 55-59</td>
<td>12 16</td>
</tr>
<tr>
<td>7 1 4 16 5 12 25 14 27</td>
<td>60-64</td>
<td>13 21</td>
<td>8 2 4 17 6 13</td>
<td>26 65-69</td>
<td>9 30</td>
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<td>9 2 5 18 7 14 27 17 31</td>
<td>70-74</td>
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<td>Modified from Chart by the American Heart Association, April 2002</td>
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1. Revision History
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

Published by permission of Dr. D.R. Jones from ‘Psychiatric Factors in Civil Aviation Medicine’. David R. Jones, MD, MPH. 10 January 2001. This is extracted from material provided by the FAA’s Civil Aviation Medicine Institute to its Basic Aviation Medical Examiner Course.

1. Clues that may be available before the examination begins:
   - You may know something of the reputation of the applicant in the community.
   - You may learn something from the applicant’s interaction with your office staff.
     
     Applicants with mental health problems may behave differently with office staff than with the examiner. Consider this if your staff points out behavioural problems or eccentricities.

2. Clues on Medical Certification form:
   - The applicant’s form contains careless or missing marks.
     Obtain the correct or missing data and ask why the mistake was made.
   - The class of certificate desired is not usual for this type of pilot.
     Find out how flying fits into the applicant’s lifestyle and plans.
   - The applicant does not live or work locally.
     Consider the type and stability of the applicant’s occupation.
     Discuss how the applicant came to pick you to do this examination.
   - Previous examinations were not completed.
     Was the applicant learning what to say or not say in order to pass?
   - Previous problems prevented certification (medical or mental health history).
   - Previous experience with health professionals was not adequately explained.
   - Pilot has had personal counselling by mental health professionals or paraprofessionals.
   - Pilot time is unusual or contains unexplained gaps.
     Ask for explanation from a high-time pilot with no date of last examination.
   - Medication history suggests significant illnesses that pilot did not note on the history questionnaire.
     Obtain an adequate history.
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

- Explanations for any medical history or findings do not make sense or seem illogical.

  Remember Jones’s *Rule of Irrational Data*: If you don’t understand what a flier means, assume it’s your problem. Ask again, clearly. If the flier tries hard to explain, you try hard to understand, and you still don’t understand, it’s probably the flier’s problem. Find out what it is. Possibilities include simple misunderstandings, English as a second language, educational deficiencies, cultural differences, limited intelligence, neurological problems, or psychiatric problems.

3. Clues obtained during the physical examination:

- Note anything markedly different from what you usually see in pilots: trust your instincts.

- Assess the nature of the applicant’s motivation to fly (Jones, 1986). Err on the side of caution.

  *Watch for applicants who want to be fliers rather than who want to fly.* Some see themselves as alienated from others, or inept, or weak, and wish to acquire the attributes they perceive to be those of fliers: gregarious, competent, and strong.

  *Watch for applicants who want to fly in order to prove fearlessness.*

- Look for scars without explanation obtained by history. Palpate scalp and skull for evidence of old head injury.

  *Watch for applicants whose collection of scars reflects personal recklessness.*

- Watch for applicants who are evasive about surgical scars or head injury scars. Ask about significant loss of consciousness or amnesia if pilot did not report the injury on the 8500-8.

- Observe other pertinent physical factors bearing on mental status (e.g., dress, grooming conduct, alcohol on breath, needle tracks, tattoos that suggest sociopathy, slash scars on wrists, spider nevi, hepatomegaly, blood pressure, heart rate, pupils).

- Talk with applicants before, during, and after the physical examination—inquire about home, work, education, military, or flying. Trust your judgment if you feel uneasy.
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

- Inquire about non-prescription medications, herbal remedies and dietary supplements.

  Such information may be aeromedically significant because of the nature of these remedies, or because of the symptoms for which the pilot feels they are necessary. Taking St. John’s Wort may indicate the presence of depressive symptoms, for instance.

4. What to do when you have finished:

- Ask enough questions to clarify troublesome issues.
- Obtain indicated medical data.
- If anything you encounter raises clinical questions about the applicant’s mental status, or even if you find yourself feeling uncomfortable without knowing exactly why, perform a brief mental status evaluation, using some or all of the items in the Formal Mental Status Examination (MSE) that follows.

  Note that some clinical MSEs, such as the Mini-Mental Status Examination, assess only the Sensorium rather than the entire mental status of a person.

- If you find anything that indicates clinical problems, consider necessary specialty consultations. Again, trust your judgment as an examiner, even if you can’t exactly define what’s wrong.
- Mention equivocal items in “Comments” section of Original or Renewal form for the record, even if you grant the certificate. Your data will be on record if the item arises in future examinations.
- If in doubt, call CASA AVMED for advice.
- If in serious doubt, defer; let CASA decide.
- As a last resort: make a “Don’t quote me” call to the medical authority.
Formal Mental Status Examination

AMSIT (Appearance, Mood, Sensorium, Intelligence, Thought) is adapted from a formulation by David Fuller, MD, as presented in R.L. Leon, MD. Psychiatric Interviewing: A Primer. Ed 2, New York; Elsevier/Science Publishing Co. 1989.

Appearance, Behaviour, and Speech

- **Physical Appearance**: apparent age, sex, and other identifying features. Appearance of being physically ill or in distress; and a careful description of the patient’s dress and behaviour.

- **Manner of Relating to Examiner**: placating, negativistic, seductive; motivation to work with examiner.

- **Psychomotor Activity**: increased or decreased, including jumpiness, jiggling, tapping, looking at watch, etc. Is the person hyperactive or lethargic?

- **Behavioural Evidence of Emotion**: tremulousness, perspiration, tears, clinched fist, turned-down mouth wrinkled brow, etc.


- **Disturbance of Attention**: distractibility, self-absorption.

- **Speech**: description—volume, rate (pressured or slowed), clarity, spontaneity and disturbances—mutism, word salad, perseveration, echolalia, affectation, neologisms, clang speech.

Mood and Affect

**Note**: “Mood is to Affect as Climate is to Weather.”

- **Mood**: use adjectives: *mild* (it’s there), *moderate* (it needs treatment), or *severe* (it needs treatment today!). Consider depression, elation, or other sustained emotions such as anger, fear, or anxiety.

- **Affect**: its range, intensity, lability, and appropriateness to immediate thought. To describe a normal, stable emotional status, say something like “The examinee’s mood is euthymic. Affect is unremarkable in range, intensity, and stability, and is appropriate to material being discussed.”

Sensorium

- **Orientation**: for time, place and situation.

- **Memory**: *immediate* (digits recall), *recent* (three items for 10 minutes, current events) and *remote* (history).
Formal Mental Status Examination

- **Calculating Ability**: serial 7’s, 11 times 13 out loud (valid only if patient is adequately educated).
- **Concentration**: spell WORLD backwards, then arrange its letters alphabetically. Repeat with EARTH.

**Intellectual Function**

Estimate current level of function as above average, average, or below average based on general fund of information, vocabulary, and complexity of concepts. Do not confuse intelligence with education. Can the examinee handle abstract ideas, reason by analogy, “make the connection” in conversation? Is the examinee about as smart as the examiner?

**Thought**

- **Coherence**: clear thoughts may be expressed incoherently.
- **Logic**: even clear, grammatical speech may express illogical thoughts.
- **Goal Directedness** (has a point and makes it): tangential or circumstantial thought.
- **Disturbance of Attention**: distractibility (interrupts own sentences), self-absorption.
- **Associations**: loose associations, blocking of obvious ideas or connections, flight of ideas.
- **Perceptions**: hallucinations (false perceptions), illusions, depersonalisation, distortion of body image.
- **Delusions**: false interpretations of real situations.
- **Other Content**: noteworthy memories, thoughts and feelings; suicidal or homicidal intent.
- **Judgement**: formal (specific set-piece situations such as “mailing a letter you find on the street”), social (how examinee behaves with examiner, how he or she “reads” other people—predictable, reasonable, comfortable).
- **Abstracting Ability**: ask pilot to define similarities/differences between tree-bush, child-midget, king-president, character-personality. This is more reliable than interpreting proverbs (stitch in time, bird in the hand).
- **Insight**: understanding of any personal dysfunction affecting self or others, and its need for treatment. Insight is lacking if there is an unacknowledged problem, superficial if it is only acknowledged (“It is a problem.”), moderate if it is personalized (“I have a problem”), and profound if “It’s my problem, and it’s up to me to fix it.”
Criteria for the Diagnosis of Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD)

Before a diagnosis of ADD/ADHD can be made, the following criteria (from DSM IV) must be fulfilled:

A. Either (1) or (2):

1. Six (or more) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
   - Often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
   - Often has difficulty sustaining attention in tasks or play activities
   - Often does not seem to listen when spoken to directly
   - Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
   - Often has difficulty organizing tasks and activities
   - Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
   - Often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
   - Is often easily distracted by extraneous stimuli
   - Is often forgetful in daily activities.

2. Six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
   - Hyperactivity
     - Often fidgets with hands or feet or squirms in seat
     - Often leaves seat in classroom or in other situations in which remaining seated is expected
     - Often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
     - Often has difficulty playing or engaging in leisure activities quietly
     - Is often "on the go" or often acts as if "driven by a motor" often talks excessively
   - Impulsivity
     - Often blurts out answers before questions have been completed
     - Often has difficulty awaiting turn
     - Often interrupts or intrudes on others (e.g. butts into conversations or games)
Criteria for the Diagnosis of Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g. at school [or work] and at home).

D. Clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g. Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

Specify Types:

- **Attention-Deficit/Hyperactivity Disorder, Combined Type**: if both Criteria A1 and A2 are met for the past 6 months.

- **Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type**: if Criterion A1 is met but Criterion A2 is not met for the past 6 months.

- **Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type**: if Criterion A2 is met but Criterion A1 is not met for the past 6 months.
**Revision History**

Note: The Revision History shows the most recent amendment first. Scroll down the table to view details of previous amendment information.

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Application for Appointment or Re-appointment as Designated Aviation Medical Examiner or Designated Aviation Ophthalmologist
(Under Regulation 6.02 of the Civil Aviation Regulations)

Forward completed form and signed declaration to the Director of Aviation Medicine, GPO Box 1544, Canberra City, ACT 2601, Fax 02 62171640, e-mail avmed@casa.gov.au.

Tick as appropriate
- [ ] Designated Aviation Medical Examiner
  - (Sign Declaration at page 3)
- [ ] Designated Aviation Ophthalmologist
  - (Sign Declaration at page 5)

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Date of birth
- ......... / ....... / .......

Nationality
- ............................................................................................................
- ............................................................................................................

Address of consulting rooms (PO Box not acceptable)
- ............................................................................................................

Postcode
- .............

Hrs/Weeks at this location
- Work .........................

Telephone
- Home .........................

Email address
- Mobile ..........................
- Work .............................

Fax
- Work .............................

Postal Address (if different from consulting rooms)
- ............................................................................................................

Post Code
- .............

University or medical school at which qualified, qualification obtained
- .................................................................

Higher qualifications

Registered as a medical practitioner in the State of
- Type of practice and/or registered specialty

Experience in aviation medicine
- ............................................................................................................
- ............................................................................................................
- ............................................................................................................

Affiliation(s) with aero/space medical organisations
- ............................................................................................................
- ............................................................................................................
- ............................................................................................................

Experience in aviation (flying, gliding, parachuting, etc) licence held (in the past or now, period held)
- ARN ........................................ Validity date ....../ .... / ....
- Hours .................................................................
- Rating ...............................................................
- Other flight crew experience .................................

Attendance of aero/space medical scientific meetings in the last three years
- Date / Organisation/location

The Federal Government TimeSaver initiative aims to assess the time taken to complete Government Forms. Please indicate the approximate time taken to complete this form.

Hrs  Mins

form 755  01/2004  aviation medicine-application-appointment or re-appointment as DAME or DAO to CASA  Page 1 of 5
CONDITIONS OF APPOINTMENT

CASA DESIGNATED AVIATION MEDICAL EXAMINER (DAME)

1. Designation is for a period of four years unless earlier terminated, and is renewable.
2. Designation lapses if the aviation medical examiner ceases to practise in the locality for which he/she is designated.
3. Designation does not extend to the DAME’s partners, assistants or locums unless written consent from the CASA Director of Aviation Medicine/Principal Medical Officer is obtained in advance of the requirement.
4. The DAME is required:

   i. to conduct himself/herself in a professional manner and in accordance with the Australian Medical Association’s Code of Ethics (details of which are available from the Association’s web page [www.ama.com.au](http://www.ama.com.au));

   ii. to be satisfied as to the identity of each applicant;

   iii. to examine personally each application presenting for examination;

   iv. to devote such time and skill to the examination of applicants as is necessary to elicit a careful history and to conduct a full and thorough examination;

   v. at the conclusion of each medical examination to forward the report to CASA promptly;

   vi. if the holder of a medical certificate tells a DAME about a medical condition that is relevant to aviation safety, the DAME must inform CASA of the condition within 5 working days;

   vii. to keep informed of, and follow the relevant standards, techniques and administrative procedures associated with medical examinations detailed in *The DAME Handbook* and in the DAME Newsletter published by CASA on its website;

   viii. to undertake continuing training, acceptable to CASA, in Aviation Medicine;

   ix. to notify CASA if absent from active practice for more than 4 weeks;

   x. to notify CASA of any change of address, of contact details, or of cessation of practice;

   xi. on cessation of appointment as a DAME, to return the DAME stamp and to destroy or return any unused examination forms to CASA;

   xii. to acknowledge CASA’s right to terminate Designation should the DAME conduct himself/herself in a manner that is detrimental to the interests of CASA or breach any of these Conditions of Appointment;

   xiii. *(Australian applicants only)* to effect and maintain membership of the Australasian Society of Aviation Medicine (ASAM) or other approved aviation medical/scientific organization;

   xiv. to authorise CASA to publish in the DAME Newsletter and the CASA website the DAME’s cessation of practice, resignation of appointment as a DAME or termination of appointment as a DAME by CASA;
xv. to authorise the regulatory authority of any ICAO Contracting State that designated or
designates the DAME to disclose to CASA information about the DAME’s performance and
competence as a medical examiner; and

xvi. to authorise CASA to disclose to the regulatory authority of another ICAO Contracting State
that designates medical examiners for that State that has designated the DAME or to which the
DAME has applied to be designated, information about the DAME’s performance as a
medical examiner.

5. The DAME is required to provide the following facilities and equipment:

i. a suitable examination room and general diagnostic equipment, including an accurate
sphygmomanometer;

ii. simple urine testing facilities;

iii. Ishihara pseudoisochromatic chart (24 plate) for colour vision testing;

iv. visual acuity charts(s) for use at 6 metres;

v. N series test types for near vision testing;

vi. ophthalmoscope;

vii. a height measuring scale (cm);

viii. weighing scales (kg);

ix. an electrocardiograph machine which complies with the Australian Standard, or a reliable
local source for obtaining ECGs when required. (A specimen tracing on a normal subject
from this machine may be required); and

x. a suitable computer, document scanner, modem and software package for communication
with CASA. (Details will be notified from time to time).

Declaration by Applicant

I have read the Conditions of Appointment (‘the Conditions’) set out above and, if designated, I agree
to accept the Conditions. Upon my designation, this declaration shall constitute my acknowledgment
for the purposes of subparagraph 4 (xii) and respective authorisation for purposes of subparagraphs 4
(xv) and (xvi) of the Conditions.

Applicant’s Signature Date ........................................../.............../......

Name.................................................................................. (Please use Block Capitals)
CONDITIONS OF APPOINTMENT

CASA DESIGNATED AVIATION OPHTHALMOLOGIST (DAO)

1. Designation is for a period of four years unless earlier terminated, and is renewable.
2. Designation lapses if the aviation medical examiner ceases to practise in the locality for which he/she is designated.
3. Designation does not extend to the DAO’s partners, assistants or locums unless written consent from the CASA Director of Aviation Medicine/Principal Medical Officer is obtained in advance of the requirement.
4. The DAO is required:
   i. to conduct himself/herself in a professional manner and in accordance with the Australian Medical Association’s Code of Ethics (details of which are available from the Association’s web page www.ama.com.au);
   ii. to be satisfied as to the identity of each applicant;
   iii. to examine personally each application presenting for examination;
   iv. to devote such time and skill to the examination of applicants as is necessary to elicit a careful history and to conduct a full and thorough ophthalmic examination;
   v. at the conclusion of each medical examination to forward the report to CASA promptly;
   vi. to keep informed of, and follow the relevant standards, techniques and administrative procedures associated with ophthalmological examinations detailed in The DAME Handbook and in the DAME Newsletter published by CASA on its website;
   vii. to notify CASA if absent from active practice for more than 4 weeks;
   viii. to notify CASA of any change of address, of contact details, or of cessation of practice;
   ix. on cessation of appointment as a DAO, to return the DAO stamp and to destroy or return any unused examination forms to CASA;
   x. to acknowledge CASA’s right to terminate Designation should the DAO conduct himself/herself in a manner that is detrimental to the interests of CASA or breach any of these Conditions of Appointment;
   xi. (Australian applicants only) to effect and maintain membership of the Australasian Society of Aviation Medicine (ASAM) or other approved aviation medical/scientific organization;
   xii. to authorise CASA to publish in the DAME Newsletter and the CASA website the DAO’s cessation of practice, resignation of appointment as a DAO or termination of appointment as a DAO by CASA;
   xiii. to authorise the regulatory authority of any ICAO Contracting State that designated or designates the DAO to disclose to CASA information about the DAO’s performance and competence as a medical examiner; and
xiv. to authorise CASA to disclose to the regulatory authority of another ICAO Contracting State that designates medical examiners for that State that has designated the DAO or to which the DAO has applied to be designated, information about the DAO’s performance as an ophthalmologist examiner.

**Declaration by Applicant**

I have read the Conditions of Appointment (‘the Conditions’) set out above and, if designated, I agree to accept the Conditions. Upon my designation, this declaration shall constitute my acknowledgment for the purposes of subparagraph 4 (x) and respective authorisation for purposes of subparagraphs 4 (xiii) and (xiv) of the Conditions.

Applicant’s Signature  
Date ............................./ ............/ ............

Name.................................................................(Please use Block Capitals)
Designated Aviation Medical Examiner’s Handbook

This is an internal CASA policy manual. It contains guidance material intended to assist CASA officers and delegates in carrying out their regulatory responsibilities and may be made available to the public for information purposes only.


Since this is an uncontrolled version of the manual, which will not be updated by CASA, it should not be relied upon for any regulatory purpose. The current manual can be viewed at any time via CASA's website at "www.casa.gov.au".

You should always refer to the applicable provisions of the Civil Aviation Act, Civil Aviation Regulations, Civil Aviation Safety Regulations and the Civil Aviation Orders, rather than this manual, to ascertain the requirements of, and the obligations imposed by or under, the civil aviation legislation.

Version 3.2: January 2005
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1.1 **Introduction**

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- 1.1.2 The Origin and Development of the CASA DAME Handbook
- 1.1.3 Appointment and Legal Status of Designated Aviation Medical Examiners (Target Audience of the Handbook)
- 1.1.4 Qualifications and Experience
- 1.1.5 Duration of Designation
- 1.1.6 Duties and responsibilities of DAMEs
- 1.1.7 Duties and Responsibilities of DAOs and DAEEs
- 1.1.8 Facilities and Equipment
- 1.1.9 Powers under the Civil Aviation Regulations
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- 1.1.12 Fees

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- 1.2.2 Classes of Medical Certificates for Licence Types
- 1.2.3 Duration of Validity
- 1.2.4 Special Reports and Tests Required for Medical Certification

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- 1.4.5 Temporary Incapacity of Certificate Holders
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- 1.4.7 Special Periodic Examinations Required
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1.1 Introduction

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<td>DAEE</td>
<td>Designated Aviation Eye Examiner</td>
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<td>DAME</td>
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<td>FAA</td>
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<td>JAA</td>
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<td>Medical Records System Online</td>
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<td>PMO</td>
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1.1.2 The Origin and Development of the CASA DAME Handbook

CASA and its antecedent organizations have published advice for DAMEs concerning practical and administrative aspects of their duties for many years. The most comprehensive and semi-permanent repository of such advice has been CASA’s DAME Handbook, which originated in the late 1980s. The original hard copy publication was an amalgam of advice derived from many sources. Some of the material can be traced back to directives produced by the Aviation Medicine Branch within the Australian Department of Civil Aviation during the 1950s. A considerable debt is due also to earlier published advice from other Regulators, particularly CAA (New Zealand) and the US FAA.

The DAME Handbook was never intended to be completely prescriptive or authoritative, particularly in its more clinically oriented sections. The principal purpose of creating (and maintaining) such a publication is to provide a compact ready reference for DAMEs and anyone else in CASA’s procedures related to aeromedical certification. Soon after The DAME Handbook was first published, a need for further explanation and elaboration of its contents became obvious, leading to creation of periodic DAME Newsletters issued by the Director of Aviation Medicine. Jointly, these publications aspired to answer DAMEs’ FAQs and to provide guidance that would reduce errors and facilitate expeditious handling of the medical examinations and reports concerning applicants prepared for CASA.
By 1998, *The DAME Handbook* was showing distinct signs of nearing the end of its useful life. Parts of the *Handbook* had been so qualified and specifically interpreted that it was sometimes difficult for DAMEs and even for staff of CASA Aviation Medicine Section to understand all requirements. Thereafter, an interim revision was produced to remove the more glaring inconsistencies and contradictions that existed between it and some DAME Newsletters. At the same time, CASA had determined that all its future public documents should be created and maintained in electronic format, available on-line, rather than as hard copy. This decision had other major implications, particularly the accessibility of all such documents to unrestricted public scrutiny.

The first on-line version of *The DAME Handbook* was posted on CASA’s website in May 1999. It represented only an interim answer to a continuing need to provide succinct, accessible, relevant advice to DAMEs and other interested persons. At that stage, much of its contents still derived from the reverence accorded to our authoritative forebears, who had not been constrained to reach decisions on evidence-based medicine principles. At least the style was brought into line with modern CASA standards.

The next priority was to review the contents of the system-based chapters in Section 2. This task has continued ever since. CASA intends that this process will continue indefinitely, to ensure relevance and currency of guidance provided. CASA is committed to procedural transparency and to meeting best-practice standards in all of its activities. Aviation Medicine Section’s accelerating, continuous review of *The DAME Handbook* reflects that commitment and will result in the availability of a better, cross-referenced and more practically useful guide.

**1.1.3 Appointment and Legal Status of Designated Aviation Medical Examiners**  
(Target Audience of the Handbook)

In order to utilise a Flight Crew Licence or Air Traffic Service Licence, it is necessary to have a medical clearance at a standard appropriate to the licence held. Within Australia, designated medical practitioners perform the necessary medical examinations for the Aviation Medicine Section of the Civil Aviation Safety Authority.

Designated medical practitioners perform medical examinations to meet the provisions of the Civil Aviation Act, the Civil Aviation Regulations and the Civil Aviation Safety Regulations. The practitioners approved to perform these examinations are known as Designated Aviation Medical Examiners (DAMEs) or Designated Aviation Ophthalmologists (DAOs). They are responsible to the Principal Medical Officer, who oversees the administration of the DAME and DAO systems.

In order to meet CASA’s needs and the needs of applicants for medical certification, appropriately qualified holders of certain positions are also permitted to undertake the duties of DAMEs and DAOs.
In order to meet CASA’s needs and the needs of applicants who are distant from regular examiners for medical certification, appropriately qualified individual practitioners may also be permitted, as needed, to undertake the duties of DAMEs and DAOs.

Certain optometrists are also approved to perform all those examinations usually carried out by DAOs. These practitioners are known as Designated Aviation Eye Examiners (DAEEs).

To request appointment or reappointment as a DAME, DAO or DAEE, complete a CASA application form (Form 755). Intending applicants may wish first to obtain additional information from one of CASA’s DAME Liaison Officers.

1.1.4 Qualifications and Experience

1. Medical practitioners designated by CASA to perform Air Crew and Air Traffic Services medical examinations must be registered with the medical registration authority of the State or Territory of the Commonwealth or country in which they reside.

2. As a signatory to the Chicago Convention, Australia is bound to appoint as DAMEs only medical examiners that have had appropriate training in aviation medicine. Possession of the Australian Certificate in Civil Aviation Medicine or similar qualification is the normal minimum requirement for appointment as a DAME. A list of courses that CASA will routinely approve for this purpose is available on the CASA website. Applicants for appointment as DAMEs on the basis of completion of other courses should contact CASA’s DAME Liaison Officers to discuss requirements.

Prior to appointment, and periodically thereafter, DAMEs are required to give an undertaking to abide by specified conditions of appointment. This is contained in Form 755.

3. DAMEs are required to attend periodic training seminars or courses in aviation medicine approved by CASA. Routinely approved seminars or courses will be posted on the CASA website. Attendance at an aerospace medicine scientific meeting such as those conducted by ASAM (formerly AMSANZ), AsMA, IAASM, FAA, CASA or similar bodies is sufficient to meet this requirement. DAMEs may also apply individually for approval of other appropriate training activities. Documented attendance at an appropriate activity is usually required at least once every two years.

Because DAOs and DAEEs examine and report only on applicants’ vision, they are encouraged but not required to undertake appropriate training in aviation medicine. However, these practitioners are required to undertake continuing professional education approved by CASA. (CASA will accept evidence of completion of continuing professional education required by an appropriate professional college, association or registration authority as satisfying this requirement).
4. DAMEs resident in Australia are required to effect and maintain membership of the Aviation Medical Society of Australia and New Zealand/the Australasian Society of Aerospace Medicine.

5. DAOs and DAEEs resident in Australia are required to effect and maintain membership/associate membership, as appropriate, of the Aviation Medical Society of Australia and New Zealand/the Australasian Society of Aerospace Medicine.

6. All designated examiners should, as far as possible, be aware of the conditions in which applicants for medical certification are employed or operate. CASA encourages designated examiners to acquire practical experience of these conditions.

7. Designation is usually granted only to practitioners in full-time practice and for one address. Continued designation is subject to the terms set out in the application for appointment in Form 755.

1.1.5 Duration of Designation

CASA appoints DAMEs, DAOs and DAEEs for periods specified at the time of appointment. They are required to re-apply for appointment at the end of each such period.

Designation lapses if the designated examiner ceases to practise at the location for which he/she is appointed, unless CASA approves a changed practice location.

Designation lapses if the designated examiner fails to observe the relevant conditions of appointment as set out in Form 755.

Designation does not automatically extend to a designated examiner’s partners, assistants, locums or successors without prior CASA approval, which should be sought well in advance of any anticipated need. Designated examiners who wish to have other practitioners act in their stead should contact CASA to ascertain precise requirements. For DAMEs’ proposed locums, completion of an approved aviation medicine course is a prerequisite for approval. CASA does not usually approve locum appointments for periods of less than four weeks.
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1. Administrative Aspects

1.1 Introduction

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1.1.6 Duties and responsibilities of DAMEs

CASR 67.125 1. On becoming aware of any condition of potential aeromedical significance in the holder of or applicant for an aviation medical certificate, the DAME must notify CASA of full details within five working days. Note that certain minor conditions (see 1.4.5 Temporary Incapacity of Certificate Holders) need not be reported until the applicant’s next-following routine medical assessment. CASR 67.125 refers

CASR 67.170 2. The DAME must be satisfied as to the identity of each applicant for medical certification. Unless the DAME personally knows the applicant, he/she must sight a photographic identity document of the applicant. Subsequently, the DAME is required to certify that he/she has formally identified each applicant. CASR 67.170 refers.

\[\text{Note: It is prudent to remind applicants, when making appointments, of the need to bring photographic identification to their appointments}\]

3. The DAME is to answer the medical history questions in the medical assessment report, in conjunction with the applicant, and ensure that the applicant understands each such question.

4. The DAME is to examine personally each applicant presenting for examination, and record the results in the medical assessment report.

5. The DAME is to perform or arrange for any investigations or specialist assessments that are necessary for the examiner to be satisfied that the applicant meets the medical standard for the class of medical certificate sought. See Examiners With Farnsworth Lantern Testing Facilities on the CASA website.

6. The DAME is to comply with CASA’s directions concerning completion and lodgement of medical reports.

7. The DAME is to forward to CASA each medical report or ancillary report received concerning an applicant for medical certification. In usual circumstances, all such reports should be dispatched within 14 days of receipt unless the DAME has contacted CASA and a different schedule has been agreed.

8. The DAME is to ensure that the applicant signs the required statement on completion of the examination. Thereafter, the DAME is to complete his/her details on the statement, and forward it to CASA within the specified period. Under no circumstances should the statement be given to the applicant to dispatch to CASA.
9. The DAME is to maintain an up-to-date knowledge of the relevant civil aviation medical standards and techniques required by CASA and by ICAO, and also interpret these requirements for applicants for medical certification. In particular, the DAME is to acknowledge promptly advice from CASA on publication of DAME Newsletters or of changes to the DAME Handbook.

10. The DAME is to notify CASA promptly of any change of address, change of e-mail address, change of telephone number, or absence from practice for periods of four weeks or more.

11. The DAME is to display his/her certificate of appointment as a DAME in his or her professional rooms.

12. The DAME is to return his/her official stamp to CASA on cessation of appointment.

13. The DAME is to use his/her official stamp only for CASA-related purposes. In particular, it should not be used as a means of certifying completion of any medical examinations not required by CASA.

14. CASA requests that DAMEs inform the Authority of details when they learn of the death of any medical certificate holder. (Although this is not a requirement of appointment, such notice is useful for CASA’s monitoring of the health of Australia’s aviation workforce.)

### 1.1.7 Duties and Responsibilities of DAOs and DAEEs

**CASR 67.125**

1. On becoming aware of any condition of potential aeromedical significance in the holder of or applicant for an aviation medical certificate, the DAO or DAEE must notify CASA of full details within five working days. Note that certain minor conditions need not be reported until the applicant’s next-following routine medical assessment (see 1.4.5 Temporary Incapacity of Certificate Holders). CASR 67.125 refers.

**CASR 67.170**

2. The DAO or DAEE must be satisfied as to the identity of each applicant for medical certification. Unless the DAME or DAEE personally knows the applicant, he/she must sight a photographic identity document of the applicant. Subsequently, the DAO or DAEE is required to certify that he/she has formally identified each applicant. CASR 67.170 refers.

**Note:** It is prudent to remind applicants, when making appointments, of the need to bring photographic identification to their appointments.

3. The DAO or DAEE is to examine personally each applicant presenting for examination, and record the results in the eye examination report.
4. The DAO or DAEE is to comply with CASA’s directions concerning completion and lodgement of eye examination reports. See *Examiners With Farnsworth Lantern Testing Facilities* on the CASA website.

5. The DAO or DAEE is to ensure that the applicant signs the required statement on completion of the examination, enter his/her details on the statement, and forward it to CASA within the period specified.

6. The DAO or DAEE is to maintain an up-to-date knowledge of the relevant civil aviation medical standards and techniques required by CASA and by ICAO, and also interpret these requirements for applicants for medical certification. In particular, the DAO or DAEE is to acknowledge promptly advice from CASA on publication of DAME Newsletters or of changes to the DAME Handbook.

7. The DAO or DAEE is to notify CASA promptly of any change of address, change of e-mail address, change of telephone number, or absence from practice for periods of four weeks or more.

8. The DAO or DAEE is required to display his/her certificate of appointment as a DAO or DAEE in his or her professional rooms.

9. The DAO or DAEE is to return his/her official stamp to CASA on cessation of appointment.

10. The DAO or DAEE is to use his/her official stamp for CASA-related purposes only.

### 1.1.8 Facilities and Equipment

DAMEs are required to provide the facilities and equipment as set out in Form 755 under *Conditions of Appointment of DAMEs* – paragraph 5.

DAOs and DAEEs are required to provide appropriate facilities and equipment for eye examinations as required by CASA.

### 1.1.9 Powers under the Civil Aviation Regulations

The Civil Aviation Safety Regulations confer the following powers on DAMEs:

- Extension of the period in force of a current medical certificate, unless it bears the condition ‘Renew by CASA only’. Refer CASR 67.210.
1. Administrative Aspects  
1.1 Introduction

Approved by Assistant Director, Aviation Safety Standards  Version 3.0: December 2003

CASR 67.225
- Renewal of the validity of a medical certificate that expired within three months of the examination, unless it bears the condition ‘Renew by CASA only’. Refer CASR 67.225.

CASR 67.225(3)
- Direction of an applicant for medical certification to provide or to authorise release by other parties of any information necessary to determine whether the applicant meets the required medical standard for certification. Refer CASR 67.225(3)

CASR 67.235(2)
- Certification of continuing fitness for duty of pregnant air traffic control staff during late pregnancy. Refer CASR 67.235(2).

CASR 67.265(4), 67.270(3)
- Certification of return of fitness to exercise privileges of a licence in a medical certificate holder who has been affected by a medically significant condition for a prescribed period. Refer CASR 67.265(4) and CASR 67.270(3)

1.1.10 Responsibilities Under the Civil Aviation Regulations

The Civil Aviation Safety Regulations confer the following responsibilities on DAMEs:

- To comply with any applicable requirements contained in the *DAME Handbook*
- To observe of the *Code of Ethics* of the Australian Medical Association
- To attend appropriate continuing education activities relevant to their aviation medicine practice
- To report to CASA within five working days any safety-relevant condition detected in an applicant

CASR 67
- To complete and promptly forward to CASA a Notice/Declaration/Consent/Authorisation: Medical Certification of Applicants form in respect of each applicant examined. Note that part of this process requires the DAME to certify the identity of the applicant.

CASR 67.060, 67.170
Further details appear in CASRs 67.060 and 67.170.

The Civil Aviation Safety Regulations confer the following responsibilities on DAOs and DAEEs:

- To comply with any applicable requirements contained in the *DAME Handbook*.
- To observe of the *Code of Ethics* of the Australian Medical Association or the Optometrists’ Association Australia, as appropriate.
- To report to CASA within 5 working days any safety-relevant condition detected in an applicant.
Further details appear in CASRs 67.080 and 67.170.

When CASA (or a DAME, DAO or DAEE) refers an applicant to a specified medical specialist of its / the referring practitioner’s choice for investigation and / or report, CASA expects that the medical specialist concerned will observe an appropriate, ethical level of professional impartiality. Supreme Court of the ACT Practice Direction No 3 of 2002 (and similar court directives issued in other Australian jurisdictions) provides relevant guidance. If in doubt as to requirements, referring professionals are invited to contact CASA Aviation Medicine Section to discuss the matter.

### 1.1.11 Protection Under the Civil Aviation Regulations

CASR 67.140

Civil Aviation Safety Regulations provide complete indemnification against civil or criminal liability for any medical practitioner or other nominated person or organisation that, in good faith, performs an indemnified act in accordance with the Regulations. Refer CASR 67.140.

For this purpose, ‘an indemnified act’ means any act whereby a DAME, other medical practitioner or other specified person (including a DAEE) advises CASA of any concerns over the ability of a medical certificate holder or applicant to meet a required medical standard for such certification. CASA requires such advice to be provided in writing.

### 1.1.12 Fees

CASA does not set or recommend fees for general DAME, DAO or DAEE examinations.

In the case of CASA employees who are required to hold aviation licences to perform their duties and are thus entitled to reimbursement from CASA for the cost of examinations and any related tests, CASA will reimburse fees determined as reasonable by the CASA PMO. In general, CASA will accept as reasonable, fees that closely approximate the fees recommended in the current edition of the *AMA List of Medical Services & Fees*. Any additional amounts will be the responsibility of the examinee. In cases of doubt or unusual complexity, examiners are invited to discuss the matter with the CASA PMO. Note that CASA will not accept responsibility for any treatment expenses incurred by its employees arising from findings in the course of routine assessments for medical certification.

When presenting for assessment, CASA employees should either present a CASA claim for payment form, with details of where to send it to obtain payment, or personally pay for the consultation and claim reimbursement from CASA. Examiners should not send accounts to Aviation Medicine Section unless this has been previously agreed as the result of a specific request from Aviation Medicine Section.
Where a DAME has been required to expend additional time and effort for a CASA employee in arranging specialist referrals or investigations, obtaining and interpreting copies of reports, or on similar activities, an approach to the CASA PMO for a higher-than-normal fee may be considered.

**Additional Examinations**

Where additional consultations or investigations are necessary to ascertain if an applicant for medical certification meets the required medical standard, the applicant is usually responsible for meeting any costs involved. If such tests are undertaken principally for screening purposes, they will not generally be eligible for rebate from the Health Insurance Commission (HIC). However, if additional tests are required to elucidate a health problem for which medical opinion, investigation or treatment is clinically necessary, these should be rebatable. Affected applicants should be advised to discuss their individual cases with the HIC.

In the case of CASA employees who are required to hold aviation licences to perform their duties and are thus entitled to reimbursement from CASA for the cost of examinations and any related tests, CASA will reimburse fees determined as reasonable by the CASA PMO for additional consultations or investigations necessary to ascertain if the employee meets the required medical standard. In general, CASA will accept as reasonable, fees that closely approximate the fees recommended in the current edition of the *AMA List of Medical Services & Fees*. Any additional amounts will be the responsibility of the examinee. Note that CASA will not accept responsibility for any treatment expenses incurred by its employees arising from findings in the course of routine assessments for medical certification.
1.2.1 Licences – General

Aircrew and air traffic services licences are issued to applicants who have met the relevant technical and theoretical standards. Once a licence is issued, it continues in effect indefinitely. A valid medical certificate appropriate for the class of licence must accompany the licence for the licence holder legally to exercise the privileges of the licence.

1.2.2 Classes of Medical Certificates for Licence Types

There are three medical standards relating to the various types of licences held. These three standards relate to Class 1, 2 and 3 Medical Certificates.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Applicable to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>All professional technical aircrew of powered aircraft, and is required for issue of Airline Transport Pilot Licence, Commercial Pilot Licence, Flight Engineer or Flight Navigator Licences.</td>
</tr>
<tr>
<td>Class 2</td>
<td>Student Pilot, Private Pilot, Commercial Pilot Balloons and Flight Radio Operator Licences.</td>
</tr>
<tr>
<td>Class 3</td>
<td>Air Traffic Control staff.</td>
</tr>
</tbody>
</table>

1.2.3 Duration of Validity

See 1.4.7 Special Periodic Examinations Required.

Unless otherwise advised by the Aviation Medicine Section:

- **Class 1**: Medical Certificate is valid for one year (but see 1.4.7 Special Periodic Examinations Required).
- **Class 2**: Medical Certificate is valid for four years, for applicants less than 40 years of age on the day of issue, and in all other cases for two years.
- **Class 3**: Medical Certificate is valid for two years.

Where an applicant’s medical condition is under review, the duration of Medical Certificate validity may be varied at the discretion of the Principal Medical Officer.
### 1.2.4 Special Reports and Tests Required for Medical Certification

<table>
<thead>
<tr>
<th>Class 1</th>
<th>Initial Issue</th>
<th>ECG, audiogram, estimation of fasting serum lipids and fasting blood glucose and an examination by CASA Designated Aviation Ophthalmologist.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Renewals</td>
<td>ECGs are required at the first renewal after the 25th, 30th, 32nd, 34th, 36th, 38th and 40th birthdays, and annually thereafter.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Audiograms are required at the first renewal after the 25th birthday and every fifth birthday thereafter.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Estimation of fasting serum lipids and of fasting blood glucose is required at the first renewal after the 25th birthday</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and every fifth birthday thereafter.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Examination by CASA Designated Aviation Ophthalmologist at age 60 and at two-yearly intervals thereafter.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class 2</th>
<th>Initial Issue</th>
<th>Where an applicant for original medical certification has a visual acuity &lt; 6/60 in either eye, an ophthalmic report from an ophthalmologist or optometrist (preferably a DAO or DAEE) is required. There are no other special requirements, except where an examiner determines a clinical indication exists.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Renewals</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class 3</th>
<th>Initial Issue</th>
<th>ECG, audiogram, estimation of fasting serum lipids and fasting blood glucose and an examination by CASA Designated Aviation Ophthalmologist.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Renewals</td>
<td>ECGs are required at the first renewal after the 25th and 30th birthdays and every two years thereafter, ie, at every subsequent routine examination.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Audiograms are required at the first renewal after the 25th birthday and then at each renewal after every fifth successive birthday.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Estimation of fasting serum lipids and of fasting blood glucose is required at the first renewal after the 25th birthday and then at each renewal after every fifth successive birthday.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Examination by CASA Designated Aviation Ophthalmologist at age 60 and at two-yearly intervals thereafter.</td>
</tr>
</tbody>
</table>

See also section 1.4.1 Electrocardiographs.
1.3 The Medical Assessing System

1.3.1 General Matters

From 2003, CASA has adopted a medical assessing system intended to automate the process of medical certification to the greatest extent practicable. The technological platform for this process is a computer-based system known as the CASA Medical Records System Online (MRS Online). Intended future development of MRS Online will further improve the speed and accuracy of medical certification.

Once MRS Online became fully operational, CASA decommissioned the former paper-based medical reporting system, which relied on optical scanning to capture and store data from routine medical assessments. CASA no longer maintains a capability to process paper-based routine reports of medical assessments. Consequently, any paper-based medical examination and report forms received are returned to the originator and a notice sent to the examinee advising him/her that the medical report has not been processed and that another is required. Note that further exercise of licence privileges is not permitted until medical certification via MRS Online is complete.

Pending further development of MRS Online, hard copies of applicant statement and examiner certification forms are still required.

CASA continues to accept hard copies of other medical reports, particularly ECGs, because of the time taken to transmit such documents electronically from some computer servers. However, CASA’s preference is for such documents to be scanned and transmitted electronically as attachments to the medical assessment form. In the near future, this will become the only available means for their lodgement.

If, for any reason, an examiner is unable to transmit a medical assessment form to CASA electronically, it is temporarily possible for an examination form to be mailed to the examiner on diskette. Once completed, the diskette can be returned and CASA can then load it manually into MRS Online. CASA does not intend to support this option in the long term because it vitiates many of the efficiency benefits available from MRS Online.

1.3.2 Medical and Ophthalmological Assessment Forms

Prior to undertaking any aeromedical examination, the examiner is to inform each applicant of the possible legal consequences of a deliberate false statement made with the intention of obtaining a medical certificate (see CASR 67). Thereafter, the examiner should obtain the applicant’s signature and complete the applicant statement and examiner certification form and record all relevant historical details obtained from the applicant.
CASA requires that the DAME personally ask the applicant the questions in the medical history section of the medical assessment report, then personally record the answers given. This allows the DAME to assess the applicant's understanding of the questions and to provide any necessary explanations.

CASA similarly requires that the DAO/DAEE personally ask the applicant the questions in the medical history section of the eye assessment report, and personally record the answers given. This allows the DAO/DAEE to assess the applicant's understanding of the questions and to provide any necessary explanations.

Slightly different historical data are required from applicants for original medical certification, where fuller details are sought, and from applicants for renewal medical certification. MRS Online automatically generates the appropriate questionnaire for each examination on the basis of its own records and/or input data.

MRS Online automatically generates an original medical history questionnaire whenever a period of 5 years or longer has passed since the applicant's last medical assessment report.

Where the holder of an existing class 2 medical certificate applies for medical certification at class 1 or 3 level, MRS Online will automatically generate an original medical history questionnaire.

### 1.3.3 The Medical Certificate

Civil Aviation Safety Regulations require an aviation licence holder to have a current, valid medical certificate appropriate to the class of licence held in order to validate the licence holder’s exercise of privileges conferred by the licence. That is, in order to exercise the privileges of an aviation licence, the licence holder must have both a licence and a valid medical certificate for the class of licence.

The medical certificate confirms that the applicant has been medically assessed, details the class of medical certificate held, the validity date, and confirms either that the required medical standard is met or details of any restrictions imposed by CASA which affect the medical certificate’s validity and therefore the use of the licence (refer 1.5.2 Frequently Used Conditions Endorsed on Medical Certificates). For professional licence holders, it also notes the dates of most recent additional examinations required (refer 1.4.6 Additional Investigations and Specialist Opinions).
DAMEs are not authorised to issue interim original medical certificates. Where permitted by Civil Aviation Safety Regulations (see CASR 67.220 and 67.225) they may revalidate an existing current medical certificate or one that has expired for less than three months (see following Section). Legally, every medical certificate is a new medical certificate. The ‘new’ medical certificates issued by DAMEs under provisions of CASR 67.225 actually refer to revalidated medical certificates that have expired for less than three months.
1.3.4 Medical Certificate Revalidation

DAMEs are not permitted to revalidate medical certificates endorsed ‘Renew by CASA only’. Affected applicants are encouraged to return to the DAME for early review, leaving adequate time for CASA to receive the periodic medical assessment and any other required reports and to make a determination on fitness for renewed medical certification.
On completion of the medical assessment, provided that the applicant appears to meet the required medical standard and provided the medical certificate has not been endorsed ‘Renew by CASA only’, the DAME may revalidate an applicant’s medical certificate only, as follows (refer CASR 67.220):

- If the applicant’s medical certificate has not expired and the assessment is conducted more than 28 days before the expiry date shown on the certificate—for up to two calendar months from the date of the assessment. (But see ‘Exception for ATPL recertification’ below).

- If the applicant’s medical certificate has not expired and the assessment is conducted within 28 days preceding the expiry date shown on the certificate—for up to two calendar months beyond the expiry date shown on the certificate.

- If the applicant’s medical certificate has expired, and the assessment is conducted within three calendar months of the expiry date shown on the certificate—for up to two calendar months from the date of the assessment.

To revalidate the medical certificate, the following endorsement is required:

‘Examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (the appropriate date to be inserted is determined according to instructions in the preceding paragraph):

DAME’s signature, date, DAME stamp.

Note: Any specialist assessments required in connection with a medical certificate renewal examination need not be performed within 28 days preceding the medical certificate’s expiry date. Guidance on CASA’s usual approach to currency of specialist reports and other investigations appears under 1.8 Frequently Asked Questions.

Exception for ATPL recertification.

Some CASA medical standards differ from those required by ICAO (refer Section 2.15). In particular, ATPL holders aged over 40 but under 60 may receive Australian class1 medical certification for 12 months, while ICAO countenances only six months. Because many of this group operate on international routes, CASA advises (and airlines require) that their medical certification is ICAO compliant.
Such applicants will often return for reassessment within the first 6 months of a medical certificate, which is valid for 12 months. In this circumstance, the DAME should endorse the applicant’s medical certificate as follows.

‘Re-examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (this will usually be the date 2 months after the assessment date)
signature, date, DAME stamp

Subsequently, in the usual course of events, CASA will issue a new class 1 medical certificate valid for a further 12 months from the date of assessment. Alternatively, CASA may issue a new medical certificate that has the effect of extending validity for six months longer than the current certificate’s expiry date. This situation will persist while ever the medical certificate holder operates as an ATPL in international air space.

**Note:** There are a number of other differences between CASA and ICAO medical standards. These particularly concern the periods of validity for medical certificates and the frequency of certain routinely required investigations or examinations. Full details likely to be of relevance to Australian examiners will be notified from time to time in *DAME Newsletters*. Those currently of interest are shown in section 2.15 of this manual. For practical purposes, only medical certificate holders who intend to exercise the privileges of licensure in other ICAO contracting states will be affected by these differences.

### 1.3.5 Assessments Other than Pass Assessments

Only CASA’s Principal Medical Officer (PMO) has the delegated power to cancel an applicant’s medical certificate(s).

Only CASA’s PMO and other CASA medical staff have the delegated power to suspend an applicant’s medical certificate(s).

A DAME may only revalidate the medical certificate of an applicant who appears to meet the required medical standard and where the medical certificate does not bear the endorsement ‘Renew by CASA only’. If a DAME has any concerns about an applicant meeting the required medical standard, he/she must decline to revalidate the medical certificate and refer the matter to CASA for determination. Relevant specialist opinions and/or investigations should be obtained and the results forwarded to CASA, together with the DAME’s opinion concerning the applicant’s fitness for certification.
To assist CASA’s consideration of applicants where there is doubt about ability to meet the required medical standard, DAMEs should avoid vague descriptive terms in their reports. Expressions such as ‘brief’, ‘infrequent’, ‘mild’, ‘some’ or similar convey no meaningful information. CASA recommends the “6W mnemonic”.

WHAT 1: What happened? (Detail signs and symptoms that led to the consultation, procedure performed etc).

WHAT 2: What were the sequelae?

WHEN: What were the dates and frequency?

WHERE: What body part was affected? (Left or right, upper arm/forearm etc).

WHY: Why was a procedure performed?

WHO: Who was involved? (Who carried out a procedure/made an assessment/is undertaking follow up, etc).

Once all necessary information has been received, CASA then submits full details of the case to a panel composed of aviation medicine practitioners. When appropriate, this panel may be supplemented by clinical or other specialists. A determination on the case will then be made and the applicant notified of the result.

If an applicant is dissatisfied with the panel’s determination, a review may be requested and/or the matter may be appealed to the Commonwealth Administrative Appeals Tribunal.

1.3.6 Identification of CASA Examiners (DAMEs, DAOs and DAEEs)

Each designated examiner (including approved locum examiners) requires an individual Aviation Reference Number (ARN), which must be obtained from CASA – refer Form1162.

CASA issues a unique identification stamp to each DAME. Each stamp carries a state or territory based code (‘A’ for ACT, ‘Q’ for Queensland etc, or ‘I’ for International) plus a three-digit number. Similarly, CASA issues a unique identification stamp to each DAO or DAEE. These also carry an alphanumeric code designating the state or territory plus a restriction limiting examinations to applicants’ eyes (‘SE’ for South Australia, ‘VE’ for Victoria, ‘IE’ for International, etc). Each stamp is intended for the exclusive use of the individual examiner to whom it is issued and, except as provided hereafter, must not be loaned to or used by any other practitioner without prior approval by the CASA PMO.

When CASA has approved a locum to act for a DAME, DAO or DAEE, the locum is to use the appropriate principal examiner’s stamp and also identify himself/herself as a locum in accordance with CASA procedures.
Locums

Locum approval must be obtained in writing from CASA prior to the dates requested. CASA requires a written request including the requested date, the contact details and signature of the proposed locum and the CV of the proposed locum. Once locum approval is gained in writing, the locum is able to perform aviation medical examinations and/or ophthalmological examinations using the existing stamp and writing ‘locum’ next to the stamp within the requested dates.

Locums are viewed the same as DAMEs and DAOs in terms of indemnification, rights and responsibilities. Locums are required to abide by the Conditions of Appointment.

CASR 67

CASA also issues DAME stamps to occupants of certain identified positions who otherwise meet the requirements for appointment as DAMEs (refer CASR 67). These are senior medical positions in the Australian Defence Force (ADF) or Royal Flying Doctor Service (RFDS). Whenever an approved ADF or RFDS medical officer performs a medical assessment under the auspices of one of these identification stamps, details of the individual examiner are also required. Thus it is only possible for ADF or RFDS medical staff who have registered with CASA to perform medical assessments under the auspices of one of these stamps.

The DAME/DAO/DAEE stamp plus the examiner’s ARN must be inserted on all applicant consent and examiner certification forms before their dispatch to CASA, together with signatures of the applicant and of the examiner.

Examiners’ identification stamps should be stored securely when not in use. The unique identification number on each stamp should be used in all correspondence between the examiner and CASA.
1.4.1 Electrocardiographs

Routine electrocardiographs are required at specified intervals for class 1 and class 3 medical certification. They may also be required on clinical grounds (see Section 2.2).

All ECGs sent to CASA are to be mounted on A4 paper and must contain the following information.

- Applicant’s full name
- Applicant’s ARN
- Date of recording.

Leads should be marked on the trace and the calibration mark should be clearly visible. The tracing should be performed using standard calibration (10 mm/mV). If half calibration is needed to clarify the standard trace, both should be sent to CASA. ECGs with slurred or incorrect calibration are not acceptable.

When self-reporting ECG machines are used, the reports are to be included with the tracings.

Where an ECG is known to be abnormal, copies of the previous ECG or reference to it (particularly regarding any changes) would be helpful and should speed CASA’s evaluation of the applicant.

Note that reports (whether by the DAME or other interpreter) should accompany all ECGs sent to CASA. Except for those already reported on by an approved specialist or interpreted by a self-reporting machine, CASA will arrange for a cardiologist to report on all ECGs. This process requires up to a week.

In future, CASA anticipates enabling on-line submission of ECGs via enhanced MRS Online. By then, CASA will likely require that all ECGs are reported on by a self-reporting machine, or interpreted and reported on by a cardiologist, physician or other specialist approved by CASA.

The DAME should also examine all ECGs and assess them as normal or abnormal, then provide details of any abnormality detected in the medical report.

Original issue ECGs performed for class 1 and class 3 applicants should be dispatched to CASA immediately following the examination. The DAME should read, assess and retain any future ECGs performed, except:

- At the first renewal after a class 1 or class 3 applicant’s 25th birthday and at designated intervals thereafter (refer to 1.4.7 ‘Special periodic Medical Examinations Required’), when copies are required for the applicant’s medical record maintained by CASA; and
- Any abnormal ECG must be sent to CASA, together with a cardiologist’s or other specialist’s report as appropriate.
1.4.2 Audiograms

The pure-tone audiogram performed by a DAME or any other person is treated by the Aviation Medicine Section as a screening test only, and is never used as the final arbiter of an applicant's ability to meet the hearing requirements for a Medical Certificate. Audiograms performed by DAMEs are acceptable. However, any audiometer used for CASA-required audiograms must have been calibrated within two years of the date of such examinations.

The audiogram result is to be stated in the medical assessment form even when a printed results slip is included with the form when lodged.

DAMEs should enclose the audiogram result printout with the medical assessment forms for all original Class 1 and Class 3 applicants.

1.4.3 Special Hearing Tests

Where a supplementary speech test is required, this can only be performed by AHS as the calibrated tapes and other equipment required are not available elsewhere. If the applicant fails the speech-based hearing test, in some cases an in-flight test may be offered if he/she has a high level of aeronautical experience. Such an operational check will involve evaluation of relevant aspects of the applicant's hearing by a CASA Flying Operations Inspector or an Authorised Testing Officer with test material transmitted from a control tower. Ideally the test should be conducted in the class of aircraft that is the same as that which the applicant normally operates.

Further information is available from CASA Aviation Medicine Section.

1.4.4 Assessment by Designated Aviation Ophthalmologists or Designated Aviation Eye Examiners

An applicant for original class 1 or class 3 medical certification requires routine assessment and reporting by a DAO or DAEE.

A class 1 applicant who has attained the age of 60 years requires further routine assessment and reporting by a DAO or DAEE. Further assessments are required at intervals of every two years thereafter (refer Section 1.4.7 ‘Special periodic medical examinations required’).

Any applicant for original medical certification who fails to meet the required visual standard also requires assessment and reporting by an ophthalmologist or optometrist, usually a DAO or DAEE. CASA will determine subsequent requirements on a case-by-case basis.
Where a DAME detects or suspects ophthalmic pathology in any applicant for medical certification, referral to a DAO for further assessment is required.

A small number of experienced class 3 medical certificate holders have been ‘grandfathered’ so as to retain their medical certification, despite being unable to meet the colour vision requirements of the class 3 standard.

1.4.5 Temporary Incapacity of Certificate Holders

Refer CASR 67.265 and CASR 67.270.

CASA requires medical certificate holders who experience any medically significant changes in medical condition to inform CASA or a DAME of such changes.

The information is required to be conveyed to CASA or a DAME after the applicant has been aware of the change:

- For a class 1 medical certificate holder, for longer than 7 days
- For a class 2 medical certificate holder, for longer than 30 days
- For a class 3 medical certificate holder, for longer than 30 days.

Thereafter, the DAME so informed is required to notify CASA of the matter within 5 working days. Refer CASR 67.125.

A licence holder must not perform any act authorised by the licence while he or she has a medically significant condition which impairs his or her ability to do the act. Before resuming the exercise of privileges under the licence, the licence holder must obtain prior confirmation of fitness from a DAME, as follows:

- For a class 1 licence holder, where the medically significant condition has been present for longer than 7 days
- For a class 2 licence holder, where the medically significant condition has been present for longer than 30 days
- For a class 3 licence holder, where the medically significant condition has been present for longer than 30 days.
A DAME usually need not perform a full medical examination in these circumstances, but should satisfy himself/herself that the applicant has recovered from the illness, injury or other medically significant condition and meets the required medical standard for exercise of the privileges of any licence held. Therefore, a DAME should not issue a medical certificate of the ‘X will be fit for duty from some later date’—type in anticipation of full recovery sufficient to meet the required medical standard.

Licence holders who fail to observe these requirements may be subject to heavy penalties, so DAMEs should take every opportunity to emphasise these legal requirements to them.

Certain trivial conditions in medical certificate holders need not be reported to CASA unless present at an applicant’s routine medical assessment. However, DAMEs are to advise applicants that these conditions must have resolved fully, without sequelae, prior to applicants resuming the exercise of privileges. Common examples include the following:

- Influenza, coryza, other URTI
- Cough in the absence of wheezing
- Sinusitis
- Occasional, mild headaches
- Uncomplicated urinary tract infection
- Gastroenteritis
- Uncomplicated haemorrhoid(s) if not bleeding and requiring only symptomatic treatment
- Mild allergic rhinitis, if no nasal blockage present and no antihistamine treatment required
- Minor soft tissue injuries without residual pain
- Muscular pain of short duration not requiring long-term medication and not related to any significant underlying chronic illness
- Dysmenorrhoea not requiring medication or absence from work
- Treated chronic fungal nail infections
- Dental extractions.

### 1.4.6 Additional Investigations and Specialist Opinions

The DAME should refer an applicant (or arrange referral through the applicant’s usual general practitioner) for appropriate specialist review(s) and/or other investigations whenever a significant abnormality in the history or physical examination of an applicant is detected. The purpose of such review or investigation is to clarify whether the applicant meets the required standard(s) for medical certification, or whether medical certification with appropriate conditions is compatible with the safety of air navigation.
Once the DAME has collated all relevant investigations and reports concerning the applicant, these should be sent to CASA, together with the DAME’s own assessment of whether the applicant meets the required standard(s) for medical certification, or whether medical certification with appropriate conditions is compatible with the safety of air navigation.

Where an applicant fails to return for follow up or completion of the assessment is delayed for more than one month for any reason, the DAME should forward to CASA advice of the situation and copies of any reports available. Thereafter, in the event of further delays, or of the applicant failing to return for review, the DAME should advise CASA as then appropriate. Written, faxed or e-mailed advice is required in these circumstances.

**Note:** MRS online will automatically capture incomplete medical examinations and highlight them for CASA’s attention 14 days after the examination has begun. CASA may then contact the DAME for an explanation of the circumstances surrounding the delayed completion of the assessment.
1.4.7 Special Periodic Examinations Required

<table>
<thead>
<tr>
<th>Certificate</th>
<th>Frequency</th>
<th>Requirements on Initial Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1 ATPL</td>
<td>12-monthly until age 60, then 6-monthly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
<tr>
<td>Class 1 CPL</td>
<td>12-monthly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
<tr>
<td>Class 2</td>
<td>Four-yearly until age 40, then two-yearly</td>
<td>FEV₁</td>
</tr>
<tr>
<td>Class 3</td>
<td>Two-yearly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
</tbody>
</table>

Examinations are as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio</td>
<td>Hearing test — audiogram</td>
</tr>
<tr>
<td>Eye</td>
<td>Specialist eye examination</td>
</tr>
<tr>
<td>ECG</td>
<td>Electrocardiogram</td>
</tr>
<tr>
<td>Serum Lipids</td>
<td>Total Cholesterol (fasting), HDL and LDL fractions</td>
</tr>
<tr>
<td>Blood Glucose</td>
<td>Blood Glucose (fasting)</td>
</tr>
<tr>
<td>Stress ECG</td>
<td>Exercise ECG on Bruce Protocol (no requirement for cardiologist referral)</td>
</tr>
<tr>
<td>FEV₁</td>
<td>Peak Flow (range is within 30% of the predicted value for height, sex and age – refer chart <a href="#">Peak Expiratory Flow in Normal Subjects</a>)</td>
</tr>
</tbody>
</table>

**Notes:**

1. All ECGs performed in connection with medical examinations marked with an asterisk (*) in the ‘Age’ column in the Class 1 and 3 table below are to be forwarded to the Aviation Medicine Section.

2. All abnormal ECGs are to be forwarded to the Aviation Medicine Section with medical assessment forms.

3. Each applicant for a class 1 or class 3 medical certificate who scores 15 or more points on the American Heart Association [Coronary Heart Disease Prediction Chart](#) must undergo a stress ECG in accordance with the instructions at Section 2.2.6.
(Notes: Contd)

4 Each applicant for a class 1 or class 3 medical certificate should have his/her risk score calculated at the original medical examination, then at the first medical examination after age 25, thereafter every 5 years until age 60, thereafter annually.

5 Fasting serum lipid estimations must include total cholesterol, high and low density lipoprotein cholesterol fractions: be certain to specify this on the pathology request form as an ‘Occupational Requirement’. (This alerts the pathology laboratory that the investigation is not HIC rebatable and usually ensures it will be performed, even when other lipid values are within normal limits).

6 On occasions, applicants may have undergone certain of these tests or specialist reviews independently of the CASA requirement. CASA will accept certified true copies of recent results (only). Guidance on acceptable recency is contained in Section 1.8. Frequently Asked Questions.
Classes 1 and 3 Additional Requirements

The table below gives the additional tests/examinations that are required at each renewal examination for applicants for Class 1 and 3 Medical Certificates. Requirements for applicants aged more than 80 years will be advised individually.

<table>
<thead>
<tr>
<th>Age</th>
<th>Tests/Examinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>25*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>30*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>32</td>
<td>ECG</td>
</tr>
<tr>
<td>34</td>
<td>ECG</td>
</tr>
<tr>
<td>35</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>36*</td>
<td>ECG</td>
</tr>
<tr>
<td>38</td>
<td>ECG</td>
</tr>
<tr>
<td>40*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td></td>
<td>An ECG is required <strong>yearly</strong> from age <strong>40 to 80</strong> for Class 1 and every <strong>two years</strong> for Class 3 (see note 3 (above) re stress ECG)</td>
</tr>
<tr>
<td>45*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>50*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>55*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>60*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>62*</td>
<td>Eye</td>
</tr>
<tr>
<td>64*</td>
<td>Eye</td>
</tr>
<tr>
<td>65*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>66*</td>
<td>Eye</td>
</tr>
<tr>
<td>68*</td>
<td>Eye</td>
</tr>
<tr>
<td>70*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>72*</td>
<td>Eye</td>
</tr>
<tr>
<td>74*</td>
<td>Eye</td>
</tr>
<tr>
<td>75*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>76*</td>
<td>Eye</td>
</tr>
<tr>
<td>78</td>
<td>Eye</td>
</tr>
<tr>
<td>80</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>&gt; 80</td>
<td>Requirements advised individually.</td>
</tr>
</tbody>
</table>
1.4 Special Investigations

Legend

<table>
<thead>
<tr>
<th>Audio</th>
<th>Hearing test—audiogram</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye</td>
<td>Specialist eye examination</td>
</tr>
<tr>
<td>ECG</td>
<td>Electrocardiogram</td>
</tr>
</tbody>
</table>

Notes:

1. All ECGs performed in the course of medical examinations marked with an asterisk (*) in this table are to be sent to the Aviation Medicine Section.
2. All ECGs interpreted or reported as abnormal are to be sent to the Aviation Medicine Section.

1.4.8 Other Special Examinations

Applicants for class 1 or class 2 medical certification who fail the Ishihara Pseudoisochromatic Plates (PIP) colour vision test are to be referred to a centre that conducts Farnsworth Lantern (FALANT) testing. Applicants for class 1 or class 2 medical certification who fail the Farnsworth Lantern tests are to be referred for practical signal light testing. Contact CASA Aviation Medical Section on 131 757 (toll free) or 02 6217 1641 (direct), for details of how to arrange this testing. Note that colour vision testing for these applicants is to follow the sequence PIP → FALANT → practical signal light testing. A pass on any of these tests will satisfy the requirements for issue of an unrestricted class 1 or class 2 medical certificate.

New applicants for class 3 medical certification are required to pass the Ishihara PIP colour vision test. No additional or alternative colour vision testing is available for this group. A small number of experienced class 3 medical certificate holders have been ‘grandfathered’ so as to retain their medical certification, despite being unable to meet the colour vision requirements of the class 3 standard.

For certain applicants, routine periodic urinalysis for drugs is a requirement of continued medical certification. It is medico legally essential that such testing be performed in accordance with a specified protocol. This protocol will be notified in due course.
1.5.1 General

Whenever appropriate, CASA places a condition or conditions of use on an applicant’s medical certificate(s) which influences the validity of the medical certificate(s). Multiple conditions may be placed on a medical certificate, and different conditions may be placed on different classes of medical certificate held by an individual.

1.5.2 Frequently Used Conditions Endorsed on Medical Certificates

<table>
<thead>
<tr>
<th>Endorsement</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renew by CASA only.</td>
<td>The DAME may not revalidate the medical certificate. Any revalidation or renewal is the prerogative of CASA Medical staff</td>
</tr>
<tr>
<td>Visual correction required.</td>
<td>Applicant requires visual correction in order to meet the visual standard. Appropriate correction must be worn when exercising the privileges of the licence. (Class 3 certificates only).</td>
</tr>
<tr>
<td>Assured Visual Correction Required</td>
<td>Applicant requires visual correction in order to meet the visual standard. Appropriate correction must be worn and a spare pair of prescription spectacles must be carried/readily available when exercising the privileges of the licence.</td>
</tr>
<tr>
<td>Near Vision Correction</td>
<td>Applicant requires visual correction in order to meet the near vision standard. Appropriate correction must be readily available and a spare pair of prescription spectacles carried/readily available when exercising the privileges of the licence.</td>
</tr>
<tr>
<td>Not valid for mustering or agricultural flying</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Valid in Australian Airspace only.</td>
<td>This endorsement indicates that the medical certificate is issued despite the holder’s failure to meet a required medical standard, as the safety of air navigation is not adversely affected. Use in any other ICAO contracting state requires specific advance approval by the Regulator for that state.</td>
</tr>
<tr>
<td>Valid in Australian airspace Only, valid up to and Including CPL</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Endorsement</td>
<td>Interpretation</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Not valid for ATPL operations.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Not valid for rotary wing operations.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Special conditions apply</td>
<td>Detailed, individually determined conditions are provided</td>
</tr>
<tr>
<td>Special conditions apply, Notified in accompanying letter dated dd/mm/yyyy</td>
<td>Detailed, individually determined conditions are set out in the referenced letter, which must be carried with the medical certificate whenever exercising the privileges of the licence</td>
</tr>
<tr>
<td>Holder to fly as or with a qualified co-pilot</td>
<td>Refer 1.5.3 Multi-Crew Endorsement</td>
</tr>
<tr>
<td>Holder is required to inform employer of the nature and extent of his/her</td>
<td>Self-explanatory (Class 3 certificates only).</td>
</tr>
<tr>
<td>medical impairment and to co-operate in establishing mitigation strategies</td>
<td></td>
</tr>
<tr>
<td>to minimise the effect of this impairment</td>
<td></td>
</tr>
<tr>
<td>Holder may exercise the privileges of the licence without supervision, but</td>
<td>Self-explanatory (Class 3 certificates only.)</td>
</tr>
<tr>
<td>there must at all times be another licensed air traffic controller who is</td>
<td></td>
</tr>
<tr>
<td>aware of the holder’s impairment present and able to assume the holder’s</td>
<td></td>
</tr>
<tr>
<td>air traffic management duties should the holder experience sudden</td>
<td></td>
</tr>
<tr>
<td>incapacitation</td>
<td></td>
</tr>
</tbody>
</table>
1.5.3 Multi-Crew Endorsement

CASA uses multi-crew endorsements as a means of risk mitigation. Their use enables pilots to continue flying and air traffic control staff to continue duty despite the presence of medically-significant conditions which would otherwise pose an unacceptable risk to the safety of air navigation.

When a class 1 or class 2 medical certificate is endorsed with the condition ‘Holder to fly as or with a qualified co-pilot’, all of the following conditions apply:

1. The holder is restricted to operating either as or with a qualified co-pilot while exercising the privileges of the licence validated by the medical certificate. (Note that it is sometimes possible for an applicant to have an ‘as or with co-pilot’ restriction on a class 1 medical certificate but an unrestricted class 2 medical certificate).

2. Aircraft requirements:
   a. side-by-side seating in the cockpit
   b. fully functioning dual controls.

3. Certificate holder requirements:
   a. to wear shoulder restraint harness at all times
   b. to be prepared to relinquish command or control of the aircraft at the onset of any incapacity
   c. to ensure that the other pilot has read the requirements in this document.

4. Other pilot’s requirements:
   a. to occupy a control seat except for short absences in transport category aircraft in the cruise with the autopilot engaged
   b. to hold command endorsement for the aircraft
   c. to be current and appropriately rated for the flight
   d. to be aware of the type of incapacity the pilot may suffer in flight
   e. to be prepared to take command of the aircraft should the other pilot be unable to continue command.

Note: This condition does not:
   a. Preclude the medical certificate holder from being left on the flight deck alone in a 2-pilot operation; or
   b. limit the medical certificate holder from operating in a 2-pilot operation with another individual who has a medical certificate with this restriction; or
   c. preclude the medical certificate holder from operating as a single pilot on a flight deck should the other pilot in a 2-pilot operation become incapacitated.
When a class 3 medical certificate is endorsed with the condition ‘Holder is required to inform employer of the nature and extent of his/her medical impairment and to co-operate in establishing mitigation strategies to minimise the effect of this impairment’, the following applies:

The holder who has such a restriction on a class 3 medical certificate is required to inform his/her employer of the nature and extent of his/her medical impairment and to co-operate with the employer in establishing strategies to minimise the risk of his/her impairment causing acute incapacitation. Relevant strategies may include, but are not limited to, measures such as special roster or shift arrangements, specified meal breaks, or guaranteed access to prescribed facilities.

When a class 3 medical certificate is endorsed with the condition ‘Holder may exercise the privileges of the licence without supervision, but there must at all times be another licensed air traffic controller who is aware of the holder’s impairment present and able to assume the holder’s air traffic management duties should the holder experience sudden incapacitation’, the following applies:

The holder who has such a restriction on a class 3 medical certificate is not permitted to undertake duty alone and is required to ensure, at the beginning of each shift, that his/her co-workers are aware of the type of incapacity the individual may experience while working and that at least one co-worker is available at all times to take over the individual’s air traffic management duties should such a sudden incapacitation eventuate.
1.6.1 General Matters

Procedures for dispatching routine medical assessment reports to CASA will be detailed in the *MRS Online Program Manual* currently under development.

*Applicant statement and examiner certification forms* should be forwarded to CASA as soon as possible following completion. On receipt, they will be scanned and attached to applicants’ medical files. (Note: CASA intends to develop more efficient alternatives to this procedure in subsequent versions of MRS Online).

ECG recordings, pathology and imaging reports and specialist consultation reports, as hard copies, should be forwarded to CASA as soon as possible following completion or when received by the examiner. Legible scanned copies of such documents may also be sent to CASA as attachments to medical assessment reports submitted online.

Lossy compression graphic formats such as JPEG should not be used because of the loss of information that accompanies the compression process. Do not attempt report scanning unless certain of the properties of the format used. CASA Aviation Medicine Section will provide further advice on request. (Note: CASA intends to develop subsequent versions of MRS Online that facilitate online lodgement of virtually all usually required documents).

Poor quality reproductions of such reports are of no use to CASA and DAMEs will be required to send replacements if MRS is unable to capture a legible image. This problem particularly arises with photocopied documents that are transmitted by facsimile.

Once a medical assessment report is received, the MRS Expert System will automatically determine whether or not the applicant clearly meets the medical standard(s) for the class(es) of medical certificate(s) sought. If the required medical standard is met, an automatic e-mail advice will immediately be dispatched to the originating DAME.

**CASR 67**

On receipt of such e-mail advice, a DAME may revalidate an applicant’s existing medical certificate for the appropriate period specified in the Regulations. Refer **CASR 67**.

**CASR 67**

If, for any reason, a DAME is unable to dispatch a routine medical assessment report immediately following its completion, but considers that an applicant meets the required standard for medical certification, the DAME may then revalidate the applicant’s existing medical certificate for the appropriate period specified in the Regulations. Refer **CASR 67**.
A DAME usually must not revalidate any medical certificate unless:

- e-mail advice from CASA confirms that the applicant meets the required medical standard; or
- he/she is unable immediately to dispatch a routine medical assessment report to CASA, but considers that the applicant meets the required medical standard; and
- the existing medical certificate does not bear the condition ‘Renew by CASA only’.

However, where the holder of a class 1 medical certificate which has been issued for 12 months is an ATPL aged over 40 who requires a medical assessment every 6 months to meet ICAO’s requirements (Refer to Section 2.15), a DAME may revalidate the existing medical certificate in the usual way for 2 months from the date of the examination, even though this period falls within the medical certificate’s continued validity for exercise of privileges in Australian airspace.

In this circumstance, the DAME should endorse the applicant’s medical certificate as follows:

‘Re-examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (this will usually be the date 2 months after the assessment date)
signature, date, DAME stamp

When a medical assessment report indicates that an applicant fails to meet the required standard for medical certification in any particular, the case will then be reviewed by CASA’s clerical assessors and/or medical staff and further advice provided to the applicant, DAME or other examiner as appropriate.
1.7.1 Aviation Reference Number (ARN) Identification

An applicant's Aviation Reference Number (ARN) must accompany all medical reports, ophthalmologists' reports, audiology reports and other specialists' reports and all correspondence concerning applicants sent to Aviation Medicine Section. All applicants should obtain an ARN prior to making an appointment with a DAME, DAO or DAEE for Original assessment. An ARN is required so the DAME or other examiner can connect to CASA's Medical Records System (MRS) to enter the applicant's medical details.

1.7.2 Aviation Reference Number (ARN) Registration

Application for an ARN can be made in person or by post. Application forms are available from the CASA website – refer Form 1162. Alternatively, visit one of the CASA Area Offices to apply in person.
A selection of frequently asked questions and answers to them is given below.

Q. When an applicant has had a required test or consultation independently some time before an equivalent CASA-required examination etc., under what circumstances will CASA accept such an examination in lieu of its own requirement?

A. The results of such external examinations are usually accepted only:
   - where the result/report is credible in all the circumstances;
   - where all parameters which CASA requires to be addressed in the report have been so addressed; and
   - where the reported findings are sufficiently recent to be likely still valid at the time of the applicant’s assessment for medical certification.

Note: CASA will not usually accept ophthalmological or audiometry reports which have not been completed on its own (electronic) stationery, even when these tests were performed for another Regulator, because of slightly different requirements and potential difficulty with interpretation.

Q. When an applicant has had a required test or consultation independently some time before an equivalent CASA-required examination etc., and it appears otherwise acceptable per provisions of the preceding paragraph, for how long will CASA deem such an examination to remain valid in lieu of its own requirement?

A. The usual maximum validity periods for independent routine test reports which CASA will accept are:
   - audiogram 12 months
   - ECG 6 months (applicant < 40 years)
   - fasting blood lipids/glucose estimations 6 months
   - applicant +/- 40 years 3 months
   - ophthalmology reports 6 months

If any results are abnormal or equivocal, repeat studies will be required.

Q. When an applicant has had a clinically-indicated test or consultation independently some time before an equivalent CASA-required examination etc., under what circumstances will CASA accept such an examination in lieu of its own requirement?

A. CASA will deal with each such case on its individual merits. DAMEs and other medical practitioners involved in an applicant’s case management are encouraged to contact medical staff at CASA’s Aviation Medicine Section to discuss individual requirements.
Q. What are CASA’s requirements for medical certification of NZ-qualified pilots who are granted equivalent Australian medical certificates under the terms of the Trans Tasman Mutual Recognition Act (TTMRA)?

A. The TTMRA and the reciprocal NZ legislation apply only to professional licence holders, so effectively concern only Class 1 licence holders. The legislation is completely silent on the issue of medical certification, so CASA and CAA NZ have agreed to deal identically, as follows, with affected pilots whose initial qualifications were gained in the other country but who now have a local licence.

The CAA NZ medical certificate used to validate the original (NZ) licence may be used to validate the newly issued Australian licence until expiry of the NZ medical certificate. (For a class 1 medical certificate, this may permit a validity period of up to 12 months). The relevant authority for this is CAR 5.04 (2).

The licence holder is required to carry the CAA NZ medical certificate when exercising the privileges of the newly issued Australian licence, and also to observe any conditions set out on that medical certificate or in an accompanying letter issued by CAA NZ.

On expiry of the CAA NZ medical certificate, the holder of the licence granted under TTMRA is required to undergo a full CASA ‘Original’ Class 1 medical assessment, including ophthalmology report, audiometry, fasting blood lipid and glucose estimations and resting ECG. As for other Class 1 applicants, a stress ECG should be arranged if indicated. Thereafter, these licence holders will be required to meet identical requirements to all other Class 1 medical certificate holders, including the usual suite of periodically required screening tests.

Q. For how long after blood donation should licence holders/applicants who donate blood refrain from exercising the privileges of an aviation licence?

A. CASA recommends that holders of all classes of medical certificates should usually refrain from exercising privileges of any aviation licence for at least 24 hours after a routine blood donation. In other or unusual circumstances, consultation with a DAME or contact with CASA Aviation Medicine Section is advisable before resuming exercise of privileges.
2.1 Ophthalmology

2.1.1 Overview

Visual cues provide the pilot's most important sensory input. Good visual acuity over all working distances is essential for safe operation of an aircraft. Information should be sought about the range of visual performance required of each pilot so that relevant advice may be given about suitable correction, if required, and about protection against glare.

If there is any doubt whether a pilot meets the required visual standard, referral to a CASA Designated Aviation Ophthalmologist (DAO) or Designated Aviation Eye Examiner (DAEE) for a detailed assessment and report is mandatory. A standard form has been developed for routine ophthalmological examination required for professional aircrew and ATCs (see also 6. Aviation Medicine Forms). Original examinations must be undertaken by a DAO or DAEE.

Visual Requirements Standard – CASR Part 67

The visual requirements standards are found in the following paragraphs of CASR Part 67:

- CASR 67.150 For medical standard 1
  - CASR 67.150
  - Table 67.150
  - 1.31 – 1.39

- CASR 67.155 For medical standard 2
  - CASR 67.155
  - Table 67.155
  - 2.31 – 2.39

- CASR 67.160 For medical standard 3
  - CASR 67.160
  - Table 67.160
  - 3.29 – 3.37
2.1.2 General Visual Requirements

The Medical Standards in the Civil Aviation Safety Regulations (CASRs) stipulate that the functions of the eyes and their adnexae shall be normal. This requirement encompasses more than simply visual acuity. All Designated Aviation Medical Examiners (DAMEs) and Designated Aviation Ophthalmologists (DAOs) and Designated Aviation Eye Examiners (DAEEs) must satisfy themselves that this criterion has been fulfilled before assessing a pilot as meeting the required visual standard.

All applicants for initial issue of a Class 1 and/or 3 Certificate must be seen by a DAO or DAEE. All applicants for issue of a Class 1 and/or 3 Certificate must be seen by a DAO or DAEE at the time of first renewal of medical certificate after reaching the age of 60 years and at two-yearly intervals thereafter.

2.1.3 Refractive Error

Some degree of refractive error is found in the majority of eyes. Most of these errors are simple and are due to a slight lack of coordination of development of the various parts of the refractive system. They represent, therefore, a biological variation from the norm and should not be regarded as pathological.

Pathological refractive errors are relatively uncommon. They are due to gross developmental abnormality. The degree of error is usually high and the visual acuity is often not fully correctable while, particularly in myopia, the eye may show degenerative changes.

At birth, the majority of eyes are hypermetropic. From then until the age of eight years, this hypermetropia is seen to increase. After age eight, refraction becomes less hypermetropic (or more myopic) until approximately the age of 25 to 30 years, when relative stability is reached.
If, therefore, a young applicant has had less than the average degree of hypermetropia at birth, the natural shift to the more myopic side can result in the development of overt myopia, a development that is likely to progress until the age of 25 to 30 years, when some degree of stability is reached.

It is difficult to give an accurate prognosis of the progress of refractive errors since individuals do not necessarily conform to the population norm, and those who develop frank myopia frequently progress to the myopic side more rapidly than those who remain on the hypermetropic side of the population norm.

CASA has not placed restrictions on applicants who require high levels of correction in order to meet the required visual standards. CASA considers that ability to meet the standard is all that is required, regardless of the power of corrective lenses necessary to achieve this outcome.
2.1.4 Refractive Surgery

**Radial Keratotomy (RK)**

The role of radial keratotomy in reducing refractive errors is a significant current issue in aviation medicine. Persons who have undergone this procedure are often subject to diurnal fluctuation in visual acuity. If this is significant, (i.e. loss of more than one Snellen line for professional licence applicants and more than two Snellen lines for private licence applicants) **even if an applicant’s visual acuity is still within the pass standard**, this fluctuation constitutes failure to meet the visual requirements of the standard(s) concerned.

Applicants who undergo radial keratotomy before their myopia has stabilised are at risk of continuing progression of their myopia.

The long-term consequences of radial keratotomy are not yet well documented, so it is impossible to predict any long-term implications for pilot licensing. Applicants should be reminded of this uncertainty as it may affect their chances of employment in the aviation industry.

Following radial keratotomy, the refraction takes some time to stabilise to its new value. Flying is not permitted while the refraction is still plastic. Evidence of stability requires:

- A variation not exceeding 0.25 dioptres in refraction
- A visual acuity changing by not more than one Snellen line
- Visual acuity, which at least satisfies the minimum standard for the class of licence, at three paired serial measurements.

These three paired serial measurements are to be part of a full ophthalmological examination, are to include measurements early in the morning and late in the day, and must be delayed for at least three months following surgery. Note that some eyes may not have stabilised even as late as a year after surgery.

A second problem associated with radial keratotomy is sensitivity to glare. This can cause considerable difficulty in the healing phase but tends to settle with time. Testing of visual performance with a bright light shining at the applicant should demonstrate any continuing glare sensitivity.

All applicants whose eyes have stabilised following radial keratotomy must thereafter have an ophthalmological assessment every two years for Class 1 and 3 and every five years for Class 2 Medical Certificates.
Photo-ablative Refractive Keratectomy (PRK)

This is a new technique, using a laser, for changing refraction. The long-term implications are as yet unknown. The requirements for assessing stability after radial keratectomy outlined above should be followed after photo-ablative refractive keratectomy.

2.1.5 Monocular Pilots

Monocular pilots may be divided into two categories:

- The monocular condition—the situation in which an applicant has only one functioning eye.
- The functionally monocular condition—the situation in which an applicant has two eyes, but the visual acuity of one cannot be corrected to 6/9 or better.

Provided the visual acuity requirements can be met in the functioning eye, with or without correction, a waiver is granted for Class 2 certification, limited to Australian Airspace, for both the monocular condition and for functionally monocular pilots. Likely Conditions on an applicant’s Medical Certificate are:

- Not valid for mustering or agricultural flying.
- Valid in Australian airspace only.
- Special conditions apply.

Functionally monocular pilots who can meet the visual acuity standard with the remaining eye may obtain Class 1 certification. These applicants are required to show that flight safety is not jeopardised by the reduced visual acuity or absence of the other eye. Only the Aviation Medicine Section can issue this waiver. Likely Conditions on the resulting Medical Certificates are as set out above for Class 2 Medical Certificates.
2.1.6 Visual Acuity

Distant Vision

Record the uncorrected distant visual acuity in each eye separately, also binocular acuity. If the applicant wears correcting lenses, record the corrected acuity also for each eye and binocularly. For original examinations, check visual acuity without contact lenses and then with contact lenses. Acceptable values are as follows.

Student and Private Pilots

For students and private pilots, acceptable values are at least 6/12, corrected if necessary, in each eye. An acuity of at least 6/9 (with or without correction) with both eyes open is also required.

If the student or private pilot applicant cannot achieve 6/12 (with or without correction) in each eye, the DAME should inquire about the defective eye and record the cause.

In cases of doubt, referral to a CASA Designated Aviation Ophthalmologist or prescribing optician is indicated. These applicants may be acceptable for non-commercial licences; however, their licences will carry endorsements restricting operations to Australia.

By definition, if an applicant achieves no better than 6/12 in the poorer eye, the applicant is considered to be functionally monocular.

Applicants assessed as suitable for licensing with appropriate endorsements are required to have a stable visual condition to which they have adjusted. This provision affects pilots who have poor foveal static visual acuity but whose peripheral vision is normal (in practice, amblyopia). Those who have completely lost an eye or its vision may be assessed as fit after the Aviation Medicine Section’s consideration of such factors as the extent of visual field loss and the duration of the condition.

Professional Flight Crew and ATCs

For all professional flight crew and ATCs: 6/9, corrected if necessary, in each eye separately. Additionally, the acuity must be 6/6 or better when tested with both eyes open.

Applicants with high refractive corrections (i.e. greater than +/-5 dioptres) should be advised of the possible complications, which may affect their vision, and of the implications for their aviation careers, particularly their increased statistical chance of retinal detachment.

Note: The equivalent spherical error is taken as the sum of sphere power plus half that of the cylinder, the calculation taking account of arithmetical signs.
The High Myope

CASA prescribes no limit and high myopes who meet the standard after correction are assessed as meeting the standard. The final decision in cases of high myopia depends on the applicant’s functional visual ability and on the absence of significant ocular pathology.

Although high-density lens material has enabled the lenses in corrective spectacles for applicants with high myopia to be thinner and so not cause unacceptable peripheral distortion, contact lenses are the preferred method of visual correction for myopes who require more than 5 dioptres of correction.

Near Vision

Near vision at all ages must meet the standards specified in the CAR Schedule (N5 with or without correction at 30-50cm and N14 at one metre without correction). DAMEs must check this function at every periodic medical examination for all applicants for aviation licensing.

Professional flight crew should be advised to have periodic ophthalmological examinations from age 45 to detect early signs of developing ocular pathology.

If an applicant cannot meet the standard, he or she should be referred for an ophthalmological assessment and appropriate spectacles prescription.

Near-vision spectacles have a limited range of clear vision, which depends on the power of the lenses prescribed and on the residual accommodation of the wearer.

It is vitally important that the range of clear vision encompasses all the near objects that need to be seen clearly. Typically this ranges from the reading of maps and operating manuals at ordinary reading distance to reading the more distant parts of the instrument display at a distance of one metre or more.

It is important that the spectacles prescribed are suited to the near working distances imposed on the pilot by the configuration of the flight deck of the aircraft. This becomes increasingly critical as an applicant’s presbyopia progresses with age.

The pilot should measure the working distances encountered in all seating positions on the flight deck, and record them prior to having a prescription for near vision determined. A suggested checklist for pilots is as follows.
2.1.7 Working Distances Checklist

<table>
<thead>
<tr>
<th>Object</th>
<th>Nearest (cm)</th>
<th>Farthest (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flight instruments</td>
<td></td>
<td></td>
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<tr>
<td>Engine instruments</td>
<td></td>
<td></td>
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<tr>
<td>Checklists</td>
<td></td>
<td></td>
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<tr>
<td>Electronic Flight Instrument Systems (EFIS) and flight management display</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach charts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General charts and manuals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Overhead Panels**

Overhead panels can cause difficulty because of their close proximity to the pilot’s eyes. This proximity ensures that the presbyopic pilot has difficulty seeing legends and numerals clearly, yet in order to view through the near segment of bifocals or through look-overs it is necessary to tilt the head back awkwardly. This may present particular difficulty in some aircraft types.

Possible solutions to difficulty in viewing overhead panels:

- The simplest solution is to lift the bifocals (or look-overs) so that the head does not have to be tilted so far back.
- Flip-down spectacles can be provided with an additional lens power to focus the overhead panel clearly when viewing through the upper distance part of the bifocal lens. However, flip-downs are cumbersome and there is a risk that they may be left down, causing blurring of distance vision. There is also a risk that they may flip down inadvertently as a result of turbulence during some critical phase of flight.
- There are vocational multifocals available which have a near segment in the upper part of the lenses as well as in the lower part. However, the distance portion between the two segments is only 12 or 15mm deep giving a distant vertical field of view of only 21 to 26 degrees. Pilots may find this impedes their visual scanning.
- A special multifocal lens can be constructed to provide a small near viewing segment in one corner of the upper part of the lens.
The more complex solution should usually only be pursued if pilots experience significant and persistent problems with the overhead panel. The overhead panel usually does not demand perfect visual acuity and is not often used in critical phases of flight, so it should not be assumed that it presents serious operational difficulties.
2.1.8 Bifocal Segment Height

The height can be set so that the pilot views the instrument panel through the near segment as well as using it for charts and manuals at an ordinary reading distance.

Alternatively the segment can be set low so that it is used only for charts, manuals and reading. When viewing the instrument panel the pilot will look over the top of the near segment to use the distance part of the bifocal.

This choice will depend on:

- Whether or not the pilot is having any difficulty reading instruments on the forward instrument panel; and
- The pilot's residual accommodation. (At least 2.75 to 3.50D of accommodation is required to see the instrument panel clearly and comfortably through the distance part of the bifocals.)

If the segment is set low, the bifocals may not be suitable for everyday reading outside the aircraft. A separate pair of reading glasses of bifocals for everyday use may then be required.

How to Determine the Correct Segment Height

Optometrists and spectacle dispensers are skilled at setting the segment height correctly, but flying is a demanding occupation and it is worth taking pains to obtain an accurate prescription for the height of the near segment.

It is worth checking segment height on chosen frames or single lens distant vision glasses by stretching adhesive tape across the frame or lens whilst the pilot is seated in the cockpit. The position of the tape can be varied until its upper edge is at the height desired for the top of the near vision segment.
2.1.9 The Need for Trifocals

As presbyopia advances, the power of the near spectacle correction must be increased to compensate for further loss of accommodation power. As a result, the range of clear vision decreases.

For a pilot aged about 45 with 3.50D of residual accommodation, the power of the near addition typically prescribed is 1.00D. For this person, the range of clear vision is from two metres to 220mm, which should be more than adequate for all flight deck near-vision tasks. However, a pilot aged 50 to 55 with only 1.50D of residual accommodation is typically prescribed a near addition of 1.75D, giving a very much smaller range of clear vision from 800mm to 360mm. This range is suitable for near tasks at ordinary reading distances but does not permit clear vision of those parts of the instrument panel beyond 800mm.

When this occurs, trifocals are required. Trifocals provide an intermediate segment that has approximately half the power of the lower near segment.

2.1.10 Acceptable Forms of Correction

To comply with operational requirements, reading correction must be in the form of ‘look-overs’, bifocal or trifocal lenses as appropriate. Single vision lenses for near correction are not acceptable. See the diagram below.

![Diagram of different forms of correction lenses](image-url)
2.1.11 Progressive Power Lenses

These lenses provide a variable focus depending on which part of the lens is used for viewing. They provide a narrow intermediate visual channel and larger distant and near areas. These lenses may be associated with illusions of movement and distortion in the peripheral field of view. They should only be used for flying after adaptation in flight as a non-critical crewmember.

2.1.12 Contact Lenses

Provided the following criteria are met, contact lenses may be worn for correction of distance vision.

Both hard and soft contact acuity lenses are acceptable. The pilot must be able to wear the lenses throughout an ordinary day without experiencing any discomfort or deterioration of vision.

An acuity of 6/9 in each eye is required with correcting spectacles immediately after removal or displacement of contact lenses.

The pilot and the prescriber are responsible for ensuring that the pilot has adapted to the contact lenses sufficiently to perform his or her aviation duties. The duty period depends on the type of operations in which the pilot is engaged. The length of time that contact lenses can be worn without producing discomfort differs for private/pleasure flying and long haul commercial operations.

The choice of lens depends upon the nature of the correction required and on cabin conditions encountered.

Hard lenses tend to induce more discomfort and can be displaced by propeller wash or strong wind. Should a pilot need to remove the lenses in flight and substitute spectacles, post-wearing blur with decreased visual acuity should be anticipated.

Soft lenses do not cause those problems to the same extent. However, they may not fully correct astigmatism of greater than one dioptre.

For high myopes, soft contact lenses are preferable to spectacles. In the greatest degrees of myopia, the required visual acuity standards may not be able to be met using spectacles.

For initial issue examination, the contact lenses should be removed and the applicant’s visual acuity checked while wearing spectacles. The uncorrected vision should also be recorded. At renewal medical examinations it is not necessary for the applicant to remove the contact lenses unless the examiner considers this clinically indicated.
2.1.13 Sunglasses

Glare is often a cause of significant discomfort when flying above cloud or when flying into the sun. Sunglasses may be required in such circumstances.

There are two basic factors to consider when selecting sunglasses, namely the frame and the lenses.

Any spectacle frame reduces the field of vision. Narrow frames that carry large lenses are desirable. The most critical problem with frames arises from the presence of wide side-arms which significantly impair the peripheral visual field.

Sunglass lenses should protect the eyes from glare while not adversely affecting the visual cues necessary for safe flight. Accordingly, lenses should not be too dark, and should transmit at least 15% of incident light. The tint used should be "neutral density" (N.D.), that is, a greyish tint that does not distort colour perception or adversely affect red signal detection and recognition. The recommended tint is N.D.15.

Lenses of polycarbonate are preferred because of their impact-resistance and ability to absorb ultra-violet and infrared rays. However, these lenses can scratch readily and any scratched spectacles should be discarded.

To ensure that sunglasses provide adequate protection from solar radiation that may damage the eyes, only those sunglasses that conform to the current Australian Standard should be worn.

Sunglasses that conform to the current Australian Standard also meet acceptable standards for lens quality, frame strength and lens retention.

For aviation use, those sunglasses marked "Specific Purpose Sunglasses" are recommended, provided their frames are appropriate. The lenses of these sunglasses have been specifically designed for use in conditions of intense glare, such as in flight above cloud. At high altitude, atmospheric absorption of ultra-violet radiation is reduced.

Polarising sunglasses should not be used when flying. The polarising filter interacts with the cockpit transparency to produce a distorted and degraded visual field that poses a threat to air safety.

The pilot who already wears prescription spectacles for flying can choose from a number of options for glare protection. Prescription sunglasses with N.D.15 lenses can be obtained, or N.D.15 clip-on or flip-up sunglasses may be worn over prescription spectacles.

Pilots who require correction of their near vision only and who wear "look-overs" are advised to obtain bifocals and a plano upper segment. Clip-on or flip-up sunglasses can then be worn. However, the dangers of flip-ups previously mentioned should be recalled.
Graduated lens tint is another option. This provides glare protection for distant vision outside the aircraft, while near vision inside the aircraft is not impeded by the tint. It is usually considered that the use of a single tinted segment in bifocal glasses should be avoided as the visual effect of a "false horizon" may be disturbing and dangerous.

### 2.1.14 Photochromics

Spectacles can also be prescribed with photochromic lenses — lenses that change their density depending on the ambient light level. Under bright conditions they are like sunglasses, while in darker conditions they transmit light almost as well as untinted lenses. However, photochromic lenses have disadvantages that render them unsuitable for use by pilots.

Firstly, their transition times are relatively slow. Photochromic lenses take about five minutes to increase their density to the level of sunglasses, but more importantly, the bleaching time from maximum to minimum density can be as long as 30 minutes or more, although there is a rapid lightening of the lens in the first five minutes. This may be too long when there is a sudden variation in light during a descent into or under cloud, or because of a rapid change in cloud cover.

Their second disadvantage is that, even when fully bleached, photochromic lenses still absorb slightly more light than untinted lenses. Since vision is critically dependent on ambient light levels at night or otherwise when light levels are low, even this small decrease of light reaching the eye through photochromic lenses is undesirable. The inherent degradation of these lenses with time effectively prohibits their use in flying or controlling air traffic and applicants should not use them in these circumstances.
2.1.15 Colour Vision

Normal colour perception is becoming increasingly important as colour-coded cathode ray tube displays and colour coded visual approach lights become more prevalent. If any element of doubt exists about a pilot's ability to perceive colour normally, the case should be referred to the Aviation Medicine Section.

**Commoner Types of Colour Vision Defects**

<table>
<thead>
<tr>
<th>Type (Incidence)</th>
<th>Essential Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protanomaly (1.0%)</td>
<td>Colour matches are different from those made by normals (anomalous colour matching). Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Extreme protanomaly (0.2%)</td>
<td>Reduced colour discrimination for red, yellow and green. Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Protanopia (1.0%)</td>
<td>Confusion of red, yellow and green. Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Deuteranomaly (4.5%)</td>
<td>Colour matches different from those made by normals.</td>
</tr>
<tr>
<td>Extreme deuteranomaly (0.5%)</td>
<td>Reduced colour discrimination for red, yellow and green.</td>
</tr>
<tr>
<td>Deuteranopia (1.5%)</td>
<td>Confusion of red, yellow and green.</td>
</tr>
</tbody>
</table>

**Test Procedure**

The DAME is required to conduct a colour perception test, using the Ishihara 24-plate test. This test should be conducted even if the applicant is to be referred to an ophthalmologist. If the applicant should incorrectly identify more than two of the Ishihara plates, a test on a Farnsworth lantern is needed to determine whether or not he or she meets the colour perception standard.

The Ishihara plates test should detect all red/green colour vision defectives. Examiners should be aware, however, that some applicants may have learned the plates, and their presentation in random order is important. Other applicants have been trained to identify numbers on the plates by means of brightness cues or may even attempt to pass the plate tests by wearing an X-chrom or similar lens—a red contact lens worn in one eye which improves the colour defective's performance on the test.
Plate Testing

Reliable colour vision testing using the pseudoisochromatic plates requires that a standardised procedure be followed carefully. The main points are:

Illumination

Only the following are permitted:

- Daylight (but not direct sunlight). This is preferred.
- Fluorescent light from a fluorescent tube of 6,500 degree K colour temperature (normal daylight tubes).
- Phillips 'Bleu' incandescent lamp.
- Macbeth Colour Source C.
- Where an applicant is unable to pass the test when it is performed under artificial lighting conditions, it should be repeated in daylight before a failure is recorded. However, this additional test is not required where an applicant makes more than 12 errors or gives a history of known defective colour vision.

Note: Before using fluorescent light, check the maker's label on the end of the tube to ensure the colour temperature is that specified. Tubes labelled "warm white" or "soft white" are not suitable.

Position

The applicant may stand or be seated, but should look squarely at the test plates from about 75cm distance. The applicant’s position should be adjusted so that no specular reflection from the glossy surface of the plates is observed. The applicant should not move his or her head while taking the test.

Exposure Time

Each plate is exposed for a maximum of five seconds.

Procedure In Detail

1. Check the applicant's position, illumination, watch or clock with second hand.
2. Open the book at the first (demonstration) plate.
3. Read out at conversational speed, pausing perceptibly where indicated.
   “I am going to show you some pages of dots. On some of them you can see a number, but some have no number. I want you to tell me if you can see a number and what it is. (Pause.)
   If you can't see a number, say "no number". You have up to five seconds for each page. (Pause)
   Is that clear?”

4. Now expose each test plate in random sequence.

5. When the applicant responds, or after five seconds have elapsed, whichever is sooner, turn to the next plate. Most applicants respond almost at once.

6. If more than one response is given to a plate, eg, "It's either three or eight", say "which one are you going to choose?" If the applicant changes his or her response, record the second response.

Marking Standard

Applicants scoring two errors or less on the 24-plate edition of the Ishihara plates meet the required standard. Those making three or more errors need to be tested on the Farnsworth Lantern.

Note: If the DAME suspects that a filter aid is being used, each of the applicant’s eyes is to be tested separately and then binocularly. The results are to be notified to the Aviation Medicine Section.

Further Testing

Some applicants with defective colour vision may be safe for aviation duties, e.g. mild deuteranomals. The Farnsworth Lantern passes these while failing all protanopes and deuteranopes and most protanomals and the more severe deuteranomals.

The Australian locations of Farnsworth Lanterns are listed in 5. Colour Vision Testing. Farnsworth Lanterns are not transported to outlying areas. Examiners should refer applicants who fail the plate test directly to the nominated centres for Lantern testing. Such referrals should be noted on the examination form. If there is no record of such referral on the form, the Aviation Medicine Section notifies applicants of their right to undergo further testing.

Note: Applicants for original class 3 medical certification must pass the Ishihara Plate Test.
2. Medical Aspects
2.1 Ophthalmology

An applicant who fails to meet the colour perception standard (i.e. who fails both the Ishihara Plate Test and the Farnsworth Lantern, but who meets all other standards) is eligible for issue of an operationally restricted student pilot, private pilot or commercial pilot licence. The holder of such a licence is given a dispensation to operate at night in a suitably radio-equipped aircraft. This dispensation applies to Australian airspace only.

Class 1 and class 2 applicants who are unable to pass either the Ishihara Plate Test or Farnsworth Lantern Test may be further assessed by means of Practical Signal Light Test. Details are available from Aviation Medicine Section.

2.1.16 Cataract

Applicants who have undergone cataract extraction(s) and who achieve acceptable visual acuity with lens implant and/or contact lenses may be passed at all licence levels following individual assessment by the Aviation Medicine Section. Full reports are required.

All other cases of cataract should be referred to an ophthalmologist. A report including assessment and prognosis is required. The final decision in these cases is based on the ophthalmology report.
2.1.17 Demyelinating Disease

Multiple Sclerosis (MS) is a central demyelinating disease involving multifocal demyelination of white matter, which initially affects young people under 40 years of age. The diagnosis requires multiple attacks of demyelination separated in time and locations. A thorough neurological history is important at the time of presentation. Nuclear magnetic resonance imaging (MRI) offers some help in diagnosis but should not be substituted for good history taking.

The most common ocular manifestation of MS is optic neuritis. It is the presenting feature in 25% of cases and occurs during the course of established disease in 70%. Between 50% and 70% of patients in the 20 - 40 year age group presenting with optic neuritis subsequently develop systemic demyelination.

Optic neuritis typically presents as sudden unilateral blurred vision progressing over a few days. The vision is often described as being "washed out"; colours appear desaturated and there is often associated retro/peri-ocular pain aggravated by eye movements.

Signs include reduced acuity of variable severity from minimal to "no perception of light"; an afferent pupillary defect (pupil dilates during the "swinging light" test); and dyschromatopsia (poor colour discrimination performance).

The most common visual field defect is a central scotoma. Ophthalmoscopy may reveal a swollen optic disc although the disc is often normal in the retrobulbar type of MS. Optic atrophy (associated with previous attacks) may be found in the ipsi- or contra-lateral eye.

Visual recovery is slower than the initial loss and usually takes between four to six weeks. About 90% of sufferers recover normal visual acuity. Minor defects in colour vision and brightness appreciation may persist. The effects of subsequent attacks are additive. There is no correlation between the degree of visual defect during the attack and the final visual outcome.

All pilots with optic neuritis should be referred to a Designated Aviation Ophthalmologist. Examinations should include visual field plots of both eyes. A typical case may require CT and MRI scanning to rule out compression of optic nerves or chiasma.

Sinister features in applicants with MS include failure of visual recovery after four weeks, persistent periorcular pain, proptosis, development of a quadrantic or hemianopic visual field defect, and field defect in the contralateral eye. All cases with severe visual acuity loss (<6/60) should be further investigated.

Flying duties in between infrequent attacks are possible provided there is adequate neurological and visual function monitoring. All cases should be referred to the Aviation Medicine Section for final assessment after adequate work up.
2.1.18 Glaucoma

All applicants for flight crew licensing who have glaucoma, or whom the DAME suspects may have glaucoma, must be assessed by a Designated Aviation Ophthalmologist. The DAME should not revalidate their Medical Certificates.

**Primary Glaucoma**

**Closed Angle Glaucoma**

Applicants should not be passed until the condition has been surgically corrected. Once corrected, a pass assessment may be issued after ophthalmological review.

**Open Angle Glaucoma**

Most open angle glaucoma is controlled by medication. The Aviation Medicine Section may issue a pass assessment only after receipt of a satisfactory ophthalmologist's report, which must include results of perimetry.

Preferred treatment is with beta-blocker drops. However, applicants with glaucoma controlled by other means are assessed individually.

Open angle glaucoma that has been successfully treated by microsurgical or laser techniques may be assessed as meeting the required standard by the Aviation Medicine Section.

Open angle glaucoma controlled with drugs requires annual ophthalmological review, including perimetry.

**Secondary Glaucoma**

Medical assessment depends on the underlying disease and the effectiveness of control. All cases should be referred to a Designated Aviation Ophthalmologist.
2.1.19 Macular Disease

The symptoms of macular disease include blurring and distortion of vision with micropsia or macropsia, which can be assessed with an Amsler grid. (This consists of a piece of paper showing a 10cm square divided into 5mm squares with a central fixation dot).

The subject is asked to fixate on the central dot, with each eye separately, at one third of a metre and to mark on the chart with a pencil, scotomata or areas of distortion.

When abnormalities are present, immediate referral to a Designated Aviation Ophthalmologist is required.

The commonest conditions affecting the macula are Central Serous Retinopathy and Disciform Macular Degeneration. All cases require final assessment by the Aviation Medicine Section.

Central Serous Retinopathy

The condition affects healthy young men with a hectic lifestyle. Only one eye is usually affected and reduction of acuity is mild (6/12 or 6/18). With a direct ophthalmoscope, dulling of the macular reflex is seen, representing a shallow central retinal detachment.

Vision recovers spontaneously within six weeks in 90% of cases. Stereoaucuity is temporarily lost and pilots should not fly until full recovery occurs. Laser treatment has been shown to speed the resolution of symptoms, but does not improve the final visual outcome, and no treatment is usually advised. The condition recurs in 20 to 30% of cases and the second eye is affected in 20%.

Macular Degeneration

This condition typically affects the elderly but inherited forms may affect younger people. Ophthalmoscopy may show small grey, yellow or white lesions, like small crystals, at the macula. These are called "drusen" (German, druse = nodule).

The visual acuity is usually well preserved, 6/9 or 6/12, until a further complication occurs — the development of a subretinal neovascular membrane that spreads under the macula and reduces vision to 6/60 or less.

To prevent the visual acuity from deteriorating below standard, regular follow-up is essential. In the early stages when the vision is distorted, but the acuity well preserved, the subretinal membrane can be obliterated by argon laser treatment.
2.1.20 Retinal Detachment

This may occur at any age although it is commoner in the elderly. Myopic people, particularly high myopes, are at increased risk. Advice on the long-term prospect of an aviation career should be given to those with high myopic refractive errors.

The most frequent type of retinal detachment follows collapse of the vitreous gel — Posterior Vitreous Detachment. The symptoms are a sudden shower of floaters (caused by vitreous haemorrhage or pigment release) and flashing lights, due to vitreous traction on the retina. Urgent referral to an ophthalmologist is mandatory to exclude the presence of a retinal tear.

At the stage when the retina is torn, but not yet detached, laser treatment may be used to seal the retinal tear before fluid from the vitreous cavity passes through it to detach the retina. Once the retina begins to detach, prompt surgery is necessary. If surgery can be undertaken before the retina detaches from the macula, the prognosis for maintained vision is excellent. Once the macula has been detached for more than a few hours, visual recovery is only partial.

A special form of retinal detachment, retinal dialysis, is the commonest type of detachment seen in young, otherwise healthy people who are not myopic. It may occur after a blunt injury, which causes a tear in the extreme periphery of the retina.

Intraocular gases are often injected into the vitreous cavity during retinal detachment surgery. The most commonly used gases are air, sulphur hexafluoride (SF6) and perfluoropropane (C3F8). Air takes only three or four days to be resorbed whereas the longest acting gas, C3F8, persists for up to six weeks. Air travel should be avoided until the gas bubble resorbs. Bearing in mind even in pressurised aircraft cabin altitude can be up to 8,000ft; a dangerous rise in intraocular pressure can occur if this precaution is overlooked.

In all cases of retinal detachment, once the condition is stabilised, a computerised visual field plot is mandatory before considering the applicant for return to pilot duties. The pilot should retain a copy of the plot for future comparison. The Aviation Medicine Section assesses each case individually.

2.1.21 Retinal Injuries

If a severe injury to the eye has occurred, with definite or suspected perforation of the globe, any aerial transport should be conducted at a cabin altitude of 4,000ft or less.
2.1.22 Strabismus

Whereas some degree of heterophoria is the norm, heterotropia (i.e. a manifest deviation of one eye from its normal position which occurs despite both eyes being open and uncovered), requires assessment by a Designated Aviation Ophthalmologist and final assessment, on an individual basis, by the Aviation Medicine Section. An applicant with an acuity (corrected or uncorrected) of worse than 6/12 is unacceptable, and a binocular acuity of worse than 6/9 is also unacceptable.

A majority of squint sufferers who have excellent cosmetic results from surgery and good visual acuity in each eye may still lack normal stereopsis (depth perception). They develop distance judgement by monocular cues and these are usually superior to those available to applicants who have lost an eye. However, their fine distance judgement for near distances is inferior to those with normal binocular vision. The Aviation Medicine Section individually assesses persons lacking binocular vision.

Squint may be latent or manifest. A latent squint is likely to become manifest under the influence of such factors as illness, fatigue, stress, drugs or alcohol. A cover test alternately on each eye unmasks latent squint.

The tests described below are designed to detect those who lack binocular vision.

**Cover Test**

Test at near (30cm) and at six metres. Use an accommodation fixation target at both distances. (For near an N5-size print and for distance a 6/12 letter). Ask subject to look at the fixation target, cover one eye and observe the other eye for refixation movement. Repeat test procedure for the other eye. Any refixation movement indicates possible squint.

**Lang Stereo Test**

Test at near (30cm). Hold card still and ask subject to name any pictures seen. Pass is three pictures: cat, star and car. A new Lang stereo test that tests to 200 degrees of arc is available. This may be considered superior to the standard Lang test that tests to 55 degrees of arc.

**Worth Four Dot Test**

Subject wears red/green goggles. Pass is identifying four lights, one red, two green and one white. Test at six metres only. Those who fail can undergo further tests, for example six-metre vectograph or Bagolini lens test to confirm if they truly lack binocular vision.
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2.2.1 Introduction

This section details the requirements for cardiological assessment of an aircrew member or air traffic controller and provides guidance on the aeromedical disposition of pilots and cardiovascular disease.

The aim of the examination is to ensure that the applicant does not suffer from any cardiovascular condition which carries an increased risk of incapacitation or which produces a decrement of physiological functional reserve that may jeopardise operational safety.

The DAME should recognise that an individual with an unrestricted Medical Certificate must be capable of performing all of the activities that are possible under the licence held.

These activities could include:

- Aerobatics, with the possibility of high G forces being encountered
- Operations in extremes of temperature for long periods, and
- Operations at altitudes where the partial pressure of atmospheric oxygen is decreased to two-thirds that which exists at sea level.

2.2.2 The Cardiovascular Standard – CASR Part 67

CASR 67 The cardiovascular standards are found in the following paragraphs of CASR Part 67:

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</table>
2.2.3 Assessment

The DAME should note relevant risk factors for ischaemic heart disease in assessing an individual's cardiovascular system. The risk factors to be considered are:

- Age
- Total cholesterol (fasting estimation)
- The total cholesterol to HDL cholesterol ratio (fasting estimation)
- Blood glucose (fasting estimation)
- Cigarette smoking
- Systolic blood pressure
- Hypertension
- Diabetes Mellitus
- Obesity
- Lack of regular exercise
- Positive family history of cardiovascular disease.

An applicant with multiple coronary artery disease risk factors should be considered for more detailed examination such as stress ECG.

The requirements for mandatory 12 lead resting ECGs are detailed in section 1.4.1 Electrocardiographs in 1. Administrative Aspects.
2.2.4 General Principles

The following conditions are statistically associated with reduced functional capacity in cardiac reserve or with unpredictable risk of sudden incapacitation. Applicants with such conditions should therefore be assessed as medically unfit for certification. In individual cases, after thorough assessment, some may be granted Medical Certification.

- Uncontrolled systemic or pulmonary hypertension
- Any structural and/or physiological defect of the heart or circulation which results in regional circulatory ischaemia of a critical circulatory bed, or in ventricular hypertrophy or ventricular dilatation
- Any structural or physiological defect of the heart which results in electrical instability, either dysrhythmia or conduction defects
- A diagnosis of haemodynamically significant aortic stenosis
- Any structural or physiological defect of the heart or lungs which results in veno-arterial shunting and desaturation of arterial blood
- Any structural or physiological defect (and/or its consequences) which requires the use of cardiotonic or vasoactive agents for compensation of cardiac reserve and for control.
2.2.5 Hypertension

Uncontrolled hypertension is disqualifying. A systolic pressure of 150 mm Hg and/or diastolic pressure of 90 mm Hg are the upper limits acceptable, but the applicant's age and sex should also be considered. If either or both the systolic or diastolic pressure repeatedly exceed(s) these limits, the applicant's blood pressure is not acceptable, even if on treatment. (These values accord with recommendations of the National Heart Foundation of Australia). Investigations by 24 hour ambulant blood pressure monitoring may assist diagnosis of borderline cases.

Controlled (adequately treated) hypertension is allowable at all levels of licence provided that there is:

- No significant end organ damage
- Satisfactory ECG
- No adverse drug side effects.

Acceptable Medication

Most modern antihypertensive agents are acceptable for control of hypertension in aircrew, provided the applicant is established on the medication and has exhibited no adverse side effects from the drug(s).

The applicant must not pilot any aircraft or actively control air traffic following the commencement of antihypertensive therapy or of a changed treatment regimen until such time as there are no significant side effects from medication and, in any event, not within one week of the commencement of therapy or change in medication. Preferred drugs include diuretics, ACE inhibitors, calcium channel blockers, prazosin angiotensin II antagonists and beta-blockers. Particular care should be taken with use of antihypertensive medications by aerobatic pilots, because of the reduction in G-tolerance produced by these agents.
2.2.6 Ischaemic Heart Disease

Technical Specifications of Investigative Procedures Required in these Protocols

Stress Electrocardiogram

1. Bruce protocol with a 12 lead ECG, with monitoring for at least six (6) minutes after cessation of exercise.

2. Applicant to reach at least 85% of predicted heart rate and at least nine minutes on the Bruce protocol or equivalent on the bicycle ergometer (maximum predicted heart rate = 220 beats per minute minus applicant’s age in years for men, 200 beats per minute minus applicant's age in years for women).

3. Treadmill exercise is preferred but bicycle exercise is acceptable if the applicant is unable to perform on the treadmill.

4. Applicant should have been continuously in the time zone where testing is performed for at least 72 hours prior to the test.

5. Applicants should normally cease taking any beta-blocker 48 hours prior to the stress test, unless the medication is used to treat known ischaemic heart disease or a significant arrhythmia.

When a beta-blocker is not so ceased prior to stress testing an applicant, an explanation of the reason is required from the treating or investigating cardiologist who supervises the stress test.

6. All reports of stress tests should include the following details:
   - duration of exercise (with comment if less than nine minutes);
   - level of perceived exhaustion of the applicant; and
   - any symptoms experienced by the applicant.

7. A positive stress electrocardiogram is defined by 1.0 mm or more of horizontal or downward sloping ST segment depression at 0.08 sec after the J point.

8. A positive stress ECG is of adequate diagnostic validity if recorded when an applicant’s exercise capacity, heart rate and blood pressure responses reach at least 85% of predicted for age, sex, height and weight, and where the ST segment shift is consistent with ischaemia.

Note: A rise of more than 20 mm in systolic blood pressure response is expected. If the applicant returns a positive stress ECG with ST changes before reaching 85% of designated criteria, it is a matter of even greater aeromedical concern. Exercise electrocardiograms are a screening test for the presence of Ischaemic Heart Disease (IHD) but do not provide conclusive evidence of the presence of IHD. Applicants need not refrain from exercising privileges simply because they are required to undertake a stress ECG.
9. If an applicant is unable to reach nine minutes or equivalent on stress ECG then a gated heart pool scan and cardiologist’s opinion may be acceptable alternatives. In these circumstances, the reason for ceasing the test must be stated.

10. In appropriate circumstances (e.g., severe arthritis), pharmacological stress testing may be substituted. This should be discussed with CASA Aviation Medicine Section before it is undertaken.

11. The physician supervising the investigation should report exercise ECGs. Computer reporting of exercise ECGs is not acceptable to CASA.

**Stress Echocardiogram**

1. To be performed by an experienced laboratory, using standard recognised protocol, because of possible difficulty with interpretation.

2. Aim should be to achieve 85% of predicted heart rate, as for stress electrocardiogram, without developing any symptoms or signs of myocardial ischaemia.

3. For applicants undergoing pharmacological stress echocardiography using sympathomimetic stressors, atropine may be administered following the maximal dose of dobutamine.

4. A positive stress echocardiogram is defined by severe or extensive new wall motion abnormalities, horizontal or down sloping ST segment depression > 1mV at 0.08 seconds after the J point compared with baseline; new ST segment elevation > 0.1mV in applicants without a previous myocardial infarction, or significant tachyarrhythmia. Applicants who have a positive stress Echocardiogram should not exercise privileges until their cardiac status is clarified.

5. If an applicant is unable to achieve 85% of predicted heart rate or if the test is terminated for other reasons, the reasons for ceasing the test must be stated.

**Stress Nucleotide (Thallium or Sestimibi) Scan**


2. Bruce protocol stress to a minimum of 85% of predicted maximal heart rate and at least nine minutes exercise time.

3. Applicant should have been continuously in the time zone where testing is performed for at least 72 hours prior to the test.

4. Applicant should continue to take his/her usual medication(s) until tested.

5. Re-injection or 24 hour view if defects are present. This additional requirement may be omitted if the defect(s) is/are demonstrated to be non-reversible.
6. A satisfactory exercise nucleotide scan is recorded when the exercise or nucleotide scanning does not reveal defects consistent with myocardial ischaemia. Applicants who have a positive stress radio nucleotide scan should not exercise privileges until their cardiac status is confirmed.

**Coronary Angiogram**

1. The angiogram is to demonstrate all major vessels, their tributaries, and grafts if present.
2. Left ventriculogram should be performed.
3. A significant stenosis is considered to be present if there is greater than 50% narrowing of any artery.
4. A satisfactory coronary angiogram is recorded when there is no significant stenosis seen in the native coronary circulation and/or where coronary artery bypass grafts appear without discernible wall pathology or have only minor irregularities.

**Gated Blood Pool Scan**

1. Measurement of the ejection fraction gated heart pool scan may be required for Class 1 and 3 Medical Certificates.
2. The scan should show an ejection fraction greater than 45%.
3. Measurement of the ejection fraction by echocardiogram is permitted for Class 2 Medical Certificates.

**Electron Beam Computed Tomography and ‘Calcium Scores’**

1. Aviation Medicine is considering the potential use of this technology. However, in common with other regulators, it does not currently accept the results of these investigations as substitutes for any other required tests.

**Cardiologist’s Assessment**

This is to include recording of:

1. Clinical status.
2. Control of risk factors, including smoking and obesity.
3. Hyperlipidemia, hypertension, or diabetes mellitus.
4. A satisfactory gated heart pool scan, which should demonstrate no wall motion abnormalities associated with moderate hypokinesis.
5. An overall ejection fraction greater than 45%.
6. An acceptable fasting lipid profile, where total cholesterol is less than 5.5 mmol/L and the HDL fraction is greater than 1.0 mmol/L. Note that both HDL and LDL fractions should be recorded.

Cardiologist’s Review

This is to include recording of:

1. Clinical status.
2. Control of risk factors, including smoking and obesity.
3. Hyperlipidemia, hypertension, or diabetes mellitus.
4. An overall ejection fraction greater than 45%.
5. An acceptable fasting lipid profile, where total cholesterol is less than 5.5 mmol/L and the HDL fraction is greater than 1.0 mmol/L. Note that both HDL and LDL fractions should be recorded.

Issue of Aviation Medical Certificate Following Myocardial Infarction

Class 1 or 3 Medical Certificates

Following the infarction, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months after the event.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).
- Gated ejection fraction estimation
- Coronary angiogram, unless this has already been undertaken and reported as satisfactory.

If all of the above investigations are satisfactory, the subject may be recertificated for six months without restriction (Class 1) or nine months without restriction (Class 3).
Subsequent Reviews

12 months post myocardial infarction:
- Routine aviation medical examination
- Cardiologist’s review
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

At six-monthly intervals thereafter:
- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.

At two-yearly intervals thereafter:
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

Class 2 Medical Certificate

Following the infarction, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months after the event.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s review
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).
- Gated ejection fraction estimation.

If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction.

Subsequent Reviews

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG and report.

Five-yearly:
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).
2.2 Cardiology

Issue of Aviation Medical Certificate Following Coronary Artery Bypass Graft (CABG).

Class I or 3 Medical Certificates

Following the graft, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months after the surgery for Class 1 or for three months after the surgery for Class 3.

Recertification

Investigations required for recertification are:
- Routine aviation medical assessment
- Cardiologist’s assessment
- Stress nucleotide scan
- Gated ejection fraction estimation.

If all of the above investigations are satisfactory, the subject may be recertificated for six months without restriction (Class 1) or for nine months without restriction (Class 3).

Subsequent Reviews

12 months post coronary artery bypass graft:
- Routine aviation medical examination
- Cardiologist’s review
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

At six-monthly intervals thereafter:
- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.

At two-yearly intervals thereafter:
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

Note: Angiography is no longer routinely required each 5 years, but may be required if an applicant develops new symptoms or other evidence suggesting worsening IHD despite treatment.
Class 2 Medical Certificate

Following the graft, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months after the surgery.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG and report.

Five-yearly:

- Stress nucleotide scan or stress echocardiogram.

Issue of Aviation Medical Certificate Following Coronary Artery Angioplasty

Class I and 3 Medical Certificates

Following angioplasty, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months post angioplasty for Class 1, three months post angioplasty for Class 3. While preliminary data suggests that drug-eluting starts may reduce the incidence of post angioplasty stenosis, CASA is not prepared to reduce the six-month post treatment period at this time. CASA will continue to monitor this issue.
Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram)
- Gated blood pool scan.

If all of the above investigations are satisfactory, the subject may be recertificated for six months without restriction (Class 1) or for nine months without restriction (Class 3).

Subsequent Reviews

12 months post angioplasty:

- Routine aviation medical examination
- Cardiologist’s review
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

At six-monthly intervals thereafter:

- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.

At two-yearly intervals thereafter:

- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

**Note:** Angiography is no longer routinely required each 5 years, but may be required if an applicant becomes symptomatic or has other evidence suggesting worsening HID despite treatment.
Class 2 Medical Certificate

Following the angioplasty, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months post angioplasty.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram)
- Gated ejection fraction estimation.

If all of the above investigations are satisfactory, the subject may be recertificated for six months without restriction.

Subsequent Reviews

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.

Five-yearly:
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

Issue of Aviation Medical Certificate Following Evidence of Ischaemic Heart Disease

Class I or 3 Medical Certificates

When an applicant presents with:
- Ischaemic heart disease symptoms such as angina, arrhythmia; or
- Cardiac failure or other evidence of ischaemic heart disease, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.
Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram)
- Gated heart pool scan or ejection fraction by radio nucleotide scan.

If the stress nucleotide scan or stress echocardiogram is positive, proceed to an angiogram.

If all investigations up to and including the stress nucleotide scan or stress echocardiogram are negative, the subject may be recertificated.

If the stress nucleotide scan or stress echocardiogram is positive but a subsequent angiogram is reported as satisfactory, the applicant may be recertificated for six months.

Subsequent Reviews

At six-monthly intervals thereafter:

- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.

At two-yearly intervals thereafter:

- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

Class 2 Medical Certificate

When an applicant presents with:

- Ischaemic heart disease symptoms such as angina, arrhythmia; or
- Cardiac failure or other evidence of ischaemic heart disease, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.
Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress ECG.

If the stress ECG is negative, the subject may be recertificated without restriction.

If the stress ECG is positive, proceed to a stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

If the stress nucleotide scan is or stress echocardiogram is negative, the subject may be recertificated.

If the stress nucleotide scan or stress echocardiogram is positive, proceed to an angiogram.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.
2.2.7 Valvular Heart Disease

Uncorrected Aortic Incompetence

Class 1 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist reports are satisfactory, the applicant may be recertificated for a period of one year (class 1 applicants) or two years (class 2 applicants).

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- ECG.
Class 2 Medical Certificate

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist reports are satisfactory, the applicant may be recertificated for a period of two years.

Subsequent Reviews

- Two-yearly review by cardiologist.

Corrected Aortic Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.
Where a tissue valve is used and there is no requirement for anticoagulation and certification may be unrestricted.

Where a mechanical valve is used, the applicant is to have evidence of clinically satisfactory, well-controlled anticoagulation and Class 1 medical certification will be restricted to multi-crew operations.

Subsequent Reviews

Classes 1, 2 and 3 require yearly review by a cardiologist.

Uncorrected Aortic Stenosis

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Electrocardiogram
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and the cardiologist’s report are satisfactory, the applicant may be recertificated for a period of 12 months.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram
- Chest X-ray.
Corrected Aortic Stenosis

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and the cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.

Where a tissue valve is used and there is no requirement for anticoagulation, medical certification may be unrestricted.

Where a mechanical valve is used, the applicant is to have evidence of clinically satisfactory well-controlled anticoagulation, and Class 1 medical certification will be restricted to multi-crew operations.

Subsequent Review

Class 1, 2 and 3 all require annual review by a cardiologist.
Uncorrected Mitral Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months without restriction.

Subsequent Reviews

For Class 1 and 3 Medical Certificates, at annual intervals thereafter:

- Routine aviation medical examination
- ECG
- Cardiologist’s review.

For Class 2 Medical Certificate, at two-yearly intervals thereafter:

- Routine aviation medical examination
- Cardiologist’s review.
Corrected Mitral Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Doppler echocardiogram.

If the valve is replaced, a significant risk of embolism remains, particularly where a mechanical valve implant has been used.

For mechanical valves, Class 1 applicants will be assessed as unfit. If reports are favourable, Class 2 applicants may be recertificated for 12 months restricted to “as or with qualified co-pilot only” and Class 3 applicants may be recertificated for 12 months, with appropriate restrictions. Assessments will not be made until at least six months post surgery.

For tissue valves, if reports are satisfactory, all classes of applicants may be recertificated. For Class 1, recertification will be for up to six months only and will be restricted to operation “as or with qualified co-pilot only”. For Class 2, recertification will be possible for up to 12 months and will be restricted to operations “as or with qualified co-pilot only”. For Class 3, recertification will be possible for up to 12 months with appropriate restrictions. Assessments will not be made until at least six months post surgery.

For valve repairs, if reports are favourable, Class 1 applicants may initially be recertificated for six months, and Class 2 and Class 3 applicants may be recertificated for 12 months.

Subsequent Reviews

Valve Replacements:

- For Class 1: Six-monthly routine aviation medical examination. All applicants require cardiologist’s review with Doppler echocardiogram.
- For Classes 2 and 3: Annual routine aviation medical examination. All applicants require cardiologist’s review with Doppler echocardiogram.
Valve Repairs:

All applicants require a routine annual aviation medical examination and cardiologist’s review with Doppler echocardiogram.

Uncorrected Mitral Stenosis

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

Applicants with mild uncorrected mitral stenosis (where the valve area is greater than 1.5 cm², the heart is in sinus rhythm, where there is no history of atrial fibrillation and the left atrial diameter is less than 4.5 cm), are permitted recertification for 12 months.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- ECG.
Corrected Mitral Stenosis

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA. This will not be considered until at least three months following mitral valvotomy or replacement.

Recertification

Investigations required for recertification following mitral valvotomy are:

- Routine aviation medical examination
- Cardiologist’s assessment, which is to include assessments of the incompetence and stenosis
- Doppler echocardiogram
- ECG
- Chest X-ray.

If all of the investigations and cardiologist’s reports are satisfactory following mitral valvotomy, the applicant may be recertificated for a period of 12 months.

Following mitral valve replacement.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Doppler echocardiogram
- ECG
- Chest x-ray.

Following mitral valve replacement, Class 1 applicants will be assessed as unfit because of the increased risk of embolism. If reports are favourable, Class 2 applicants may be recertificated for 12 months, restricted to operation “as or with qualified co-pilot only” and Class 3 applicants may be recertificated for 12 months, with appropriate restrictions.
Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram.
2.2.8 Bundle Branch Blocks

**Partial or Complete Left Bundle Branch Block (Not Including Left Anterior Hemiblock)**

**Class 1, 2 & 3 Medical Certificates**

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

**Recertification**

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan
- Doppler echocardiogram
- Left ventricular gated blood scan to measure ejection fraction
- 24 hour Holter monitor recording.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for 12 months.

**Subsequent reviews**

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review.

If reports continue to be completely satisfactory for five years, applicants may then be recertificated without restriction.

**Incomplete Right Bundle Branch Block**

No specific requirements.
Complete Right Bundle Branch Block

Class 1, 2 and 3 Medical Certificates

Note: This may be a normal variant in young applicants. A cardiologist's opinion should be obtained in these cases.

Otherwise, on diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist's assessment
- Echocardiogram
- Stress ECG.

If all of the investigations and cardiologist's reports are satisfactory, the applicant may be recertificated for the maximum period permitted for the relevant medical certificate.

Left Anterior Hemiblocks

Class 1, 2 and 3 Medical Certificates

If this is a newly acquired condition, a stress ECG should be performed. If this is normal, there is no requirement for further reviews.

Atrio-Ventricular Blocks

First Degree

No specific requirements.

Second Degree — Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.
Recertification
Investigations required for recertification are:
- Cardiologist’s assessment
- 24 hour Holter monitor recording
- Stress ECG.

If all of the investigations and cardiologist's reports are satisfactory, the applicant may be recertificated for 12 months. Applicants with untreated heartblocks of 2:1 or greater will not be recertificated for any class of medical certificate.

Subsequent Reviews
An annual ECG is required.

_Third Degree Heart Block_
Restricted certification may be available with the use of pacemakers.

_Class 1, 2 and 3 Medical Certificates_

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification
Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Stress ECG (to assess cardiac function)
- 24 hour Holter monitor recording.

**Note:** The pacemaker is to be dual chambered with bipolar leads. The pacemaker is to have a technical check every 12 months, with the outcome reported to the Aviation Medicine Section.
Recurrent Atrial Fibrillation

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment, with particular reference to history and presence of any congenital abnormalities
- ECG
- 24 hour Holter monitor
- Exercise echocardiogram
- Biochemical profile, including: thyroid function studies, liver function studies, serum magnesium and potassium levels, Fasting Blood Glucose.
- Haemoglobin estimation.

If drug treatment is required, there must be adequate rate control (as assessed by a cardiologist), without significant side effects. There should be no underlying structural heart disease. In these circumstances, all applicants may be recertificated for 12 months without restriction, unless prescribed warfarin. Where Warfarin is prescribed, CASA will require evidence of good INR control.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist's review.
Atrial Flutter

Class 1, 2 and 3 Medical Certificates

On diagnosis the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment, with particular reference to history and to presence of any congenital abnormalities
- 24 hour Holter monitor
- Exercise echocardiogram
- Biochemical profile, including: thyroid function studies, liver function studies, serum magnesium and potassium levels, Fasting Blood glucose
- Haemoglobin estimation.

If drug treatment is required, there must be adequate rate control (as assessed by a cardiologist), without significant side effects. There should be no underlying structural heart disease. In these circumstances, all applicants may be recertificated for 12 months without restriction, unless prescribed warfarin.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist's review.
Wolff-Parkinson-White Syndrome

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Electrophysiological studies.

If WPWS is confirmed, the applicant is assessed as unfit until radiofrequency ablation of aberrant conduction pathways has been performed and the treating cardiologist has certified that conduction has been normalised. All applicants may then be recertificated for six months without restriction.

Subsequent Reviews

At six months, 12 months and 24 months post successful radiofrequency ablation of aberrant conduction pathways, the following are required:

- Routine aviation medical examination
- Cardiologist’s review.

If there is no recurrence of abnormal conduction within 24 months of successful radiofrequency ablation, further recertification without restriction should follow the normal pattern for the applicant’s age and class of medical certificate.

Corrected Congenital Heart Anomalies

In many cases, residual haemodynamic defects may preclude medical certification at any level for these applicants. Each case will be dealt with on its individual merits. A comprehensive cardiological work-up and report should be completed and full details forwarded to Aviation Medicine Section for assessment.

Other Cardiological Abnormalities

These can be extremely varied and range from trivial conditions to those which absolutely preclude medical certification at any level for these applicants. Each case will be dealt with on its individual merits. A comprehensive cardiological work-up and report should be completed and full details forwarded to Aviation Medicine Section for assessment.
2.2.9 Cardiomyopathies

Dilated Cardiomyopathy

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Two recordings of 24 hours Holter monitor studies
- Gated blood pool scan.

If ejection fraction is greater than 45% with no symptoms and a normal Holter monitor report, then a special Class 1 Certificate, restricted to multi-crew operations, on a planned six-monthly renewal assessment basis, may be allowed.

For Class 2 and 3 applicants who meet the same criteria, unrestricted certification for six months at a time may be allowed.

Subsequent Reviews

<table>
<thead>
<tr>
<th>Class</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>Six-monthly cardiologist’s review with gated blood pool scan</td>
</tr>
<tr>
<td>Classes 2 and 3</td>
<td>Unrestricted certification may be issued, with six monthly cardiologist’s review.</td>
</tr>
</tbody>
</table>

In all cases, if investigations/assessments are completely normal on five consecutive occasions, the applicant may thereafter be recertificated on the basis of meeting routine medical requirements, without additional assessments.
Hypertrophic Cardiomyopathy

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA. Recertification will not normally be possible for Class 1 or 3, but all cases will be assessed on their individual merits.

Recertification

In all cases, further certification will be appropriately restricted.

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment, including detailed family history
- Stress ECG
- Doppler echocardiogram
- 24 hour Holter monitor recording.

If all of the investigations and the cardiologist’s report are satisfactory, recertification may be available.

Subsequent Reviews

Requirements will be individually determined and notified.
2.2.10 Cardiac Transplant

Class 1 applicants will be assessed as unfit.

Class 2 and 3

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are.

- Routine aviation medical examination
- Cardiologist’s assessment
- Coronary angiogram (for detection of atherosclerosis)
- 24 hour Holter monitor recording
- Doppler echocardiogram.

If all of the investigations and the cardiologist’s report are satisfactory, Class 2 and Class 3 applicants may be recertificated on an individually determined basis.

Subsequent Reviews

At six-monthly intervals:

- Routine aviation medical examination
- Cardiologist’s review.

At annual intervals:

- Stress nucleotide scan
- Coronary angiogram (to assess coronary atherosclerosis)
- Doppler echocardiogram.
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2.3.1 Introduction

This section details the assessment procedures for pilots, other aircrew members and air traffic controllers who suffer or who may suffer from lung or respiratory system disease.

The aim of the respiratory assessment within the aeromedical examination is to ensure that applicants do not suffer from lung or respiratory system disease which places them at an unacceptable risk of incapacitation, or which may otherwise jeopardise the safety of air navigation.

2.3.2 The Respiratory Standard – CASR Part 67

CASR 67.150 For medical standard 1
CASR 67.150 Table 67.150
1.12 – 1.13

CASR 67.155 For medical standard 2
CASR 67.155 Table 67.155
2.12

CASR 67.160 For medical standard 3
CASR 67.160 Table 67.160
3.12

2.3.3 Assessment

All applicants for Australian aviation medical certificates are administered a comprehensive screening questionnaire physically examined by a DAME, and required to undertake a number of screening tests.

When conducting the respiratory component of the aeromedical examination, the DAME should note the presence of relevant risk factors for the development of lung and respiratory system disease and the presence of signs and symptoms suggestive or diagnostic of such conditions.

For example: risk factors for the development of asthma include:

- Family history of asthma
- Personal or family history of smoking
- Other allergies or atopic symptoms.
FEV₁ is measured at the original assessment and each renewal assessment. (Note spirometers should be calibrated to BTPS). Chest X Rays may be required if the applicant’s history or physical signs so indicate. This is likeliest in smokers or ex-smokers. Routine Chest X Ray is not required.

Further investigation of respiratory abnormalities may include flow loop spirometry, measurement of diffusion capacity, blood gas estimation (both at ground level and at simulated altitude) and various forms of imaging of the respiratory system.

Referral to a consultant respiratory physician may be required to confirm a diagnosis or to resolve concern over a differential diagnosis. CASA may also require an applicant for medical certification to be assessed by a consultant respiratory physician as part of its consideration of an applicant’s fitness for aeromedical certification.

2.3.4 Documentation of Respiratory Conditions

Many respiratory conditions are principally diagnosed and classified on the basis of history. DAMEs should take a careful and thorough clinical history before reaching a respiratory diagnosis, particularly a diagnosis that may significantly affect an applicant’s employment prospects. Particular attention must be paid to chronic use of any medications that are incompatible with the exercise of the privileges of licensure. Also see Section 2.13 Medication – Drugs and Flying/Controlling.

2.3.5 Asthma

Diagnosis and assessment

In the first instance care should be taken to ensure an accurate diagnosis of asthma, noting that the criteria of recurrent, reversible airways obstruction should be met. Subsequent assessment of asthma should distinguish between severity and control. Severity is in part determined by the amount of treatment required to maintain control (as evidenced by type and quantity of prescription or over-the-counter medications required to control asthma symptoms, the requirement for oral steroid medication and the number of Emergency Room presentations or hospital admissions due to asthma). CASA will not usually certificate applicants who suffer from severe asthma. Uncontrolled asthma, regardless of severity, is not acceptable in the aviation environment, and will preclude the issuing of any class of CASA medical certificate.

Applicants who have asthma which is well controlled (if necessary using anti-inflammatory therapy) may be eligible for any class of medical certificate. Applicants with mild well controlled asthma maybe required to undergo periodic spirometry. In the case of applicants with moderate well controlled asthma, periodic assessment by a respiratory physician may be required. CASA will notify specific requirements on a case-by-case basis.
Asthma severity

Severe asthma

Applicants with severe asthma experience continuous symptoms, limited physical capacity, and have a FEV$_1$ or peak flow measurement of less than or equal to 60% predicted. Peak flow variability may be greater than 30%. Treatment requirements of patients with severe asthma will likely include moderate or high doses of inhaled corticosteroid, with or without long-acting beta-agonist, oral theophylline, or inhaled anticholinergic. Some applicants may require oral corticosteroid. Patients with severe asthma may require care through hospital Emergency Rooms or even hospital admission when control of the condition is poor.

Moderate asthma

Applicants with moderate asthma generally have symptoms of airflow obstruction most of the time, and experience some impairment of physical capacity. Their FEV$_1$ or peak flow will be in the range 60-80% predicted, and peak flow variability may be greater than 15%. Treatment requirements will likely include low to moderate doses of inhaled corticosteroid, (e.g. beclomethasone 400-1000 micrograms per day or equivalent).

Mild asthma

Applicants with mild asthma generally have intermittent symptoms, interposed between symptom-free intervals that may be prolonged. FEV$_1$ and peak flows are often normal, and there may be no peak flow variability.

Asthma control

For CASA’s purposes, good control requires that, in the three months preceding assessment, the applicant:

- Has experienced no or minimal cough, wheeze or breathlessness on exercise or during the night
- Has maintained “best” pulmonary function
- Has maintained stable exercise capacity, although possibly somewhat impaired
- Has not required treatment with oral corticosteroid
- Has not required an Emergency Room visit/hospital admission for symptoms of asthma.
2.3.6 Chronic Bronchitis and Emphysema

Smokers aged 45 or more should undergo increased screening for these conditions for all classes of medical certificates. Positive findings dictate a full respiratory assessment, including a report by a respiratory physician. It is unlikely that applicants with severe chronic bronchitis or emphysema will meet the medical standard for issue of a class 1 medical certificate. However, restricted class 2 and 3 certification may be possible, on a case-by-case basis.

2.3.7 Pneumothorax

*Traumatic Pneumothorax.*

Medical certification for all classes is usually possible after review of medical reports covering precipitating factors, associated problems, extent of recovery and subsequent lung function. Full assessment by a respiratory physician may be required.

*Single Spontaneous Pneumothorax.*

An applicant who has had a spontaneous pneumothorax with full recovery and no obvious cause nor likelihood of recurrence may be assessed as fit for all classes of medical certification.

*Recurrent Spontaneous Pneumothorax.*

An applicant with recurrent spontaneous pneumothorax (defined as two or more episodes on the same side) is not usually acceptable for any class of medical certificate. If the pneumothorax has been surgically corrected by pleurodesis (mechanical or chemical) or pleurectomy, the applicant may be assessed as fit. Assessment by a respiratory physician may be required.

2.3.8 Pulmonary Tuberculosis

An applicant with active tuberculosis (but not open tuberculosis) may be medically certificated for any class provided there is adequate evidence that he/she is on appropriate therapy and there is no evidence of side effects from the therapy. Applicants with fully treated pulmonary tuberculosis should be aero medically assessed to determine the extent of lung damage/recovery. Assessment by a respiratory physician is required in all cases.
2.3.9 Sarcoidosis

Sarcoidosis is usually acceptable for all classes of medical certification, provided myocardial and other system sarcoidosis has been excluded. Reports of full cardiovascular and respiratory assessments are required.

2.3.10 Pulmonary Embolism

An applicant who develops pulmonary embolism must be comprehensively investigated to determine if there are significant underlying reasons for the episode. Once recovery is complete and the applicant demonstrates normal pulmonary function (including normal blood gases), unrestricted medical certification at any class is usually possible. CASA will not usually consider re-certification until at least 8 weeks after the episode. Pilots who are prescribed long-term anticoagulation with warfarin following a pulmonary embolism may be granted conditional certification.

2.3.11 Fibrosing Lung Diseases

Applicants with these conditions require full respiratory assessment, including blood gas estimation. Thereafter, certification may be possible on a case-by-case basis.

2.3.12 Obstructive Sleep Apnoea (OSA)

This condition is often under-reported because applicants fear loss of certification. DAMEs must specifically inquire whether or not the applicant has conditions that suggest OSA eg, loud habitual snoring, witnessed apnoea. Where the diagnosis is entertained, the Epworth Sleepiness Scale must be administered to the applicant. If the resulting score is 16 or more, assessment by a sleep physician is required. Following definitive diagnosis of OSA, unrestricted medical certification at all classes is usually possible after appropriate corrective treatment has been instituted and demonstrated to be successful. This usually requires reports from a sleep physician, before and after treatment.

Also see ‘Sleep Disorders’ in Section 2.6.17 (Psychiatry).

The Epworth Sleepiness Scale provides an estimate of the likelihood of dozing or falling asleep, in contrast to just feeling tired.

Applicants suspected of suffering from OSA should be questioned about their sleepiness during normal activities. (Even if the applicant has not recently undertaken some of these activities, they should be asked to estimate their relevant chance of dozing based on prior experiences).
Use this scale to allocate scores under 'chance of dozing' in each situation described.

0 = no chance of dozing  
1 = slight chance of dozing  
2 = moderate chance of dozing  
3 = high chance of dozing

<table>
<thead>
<tr>
<th>Situation</th>
<th>Chance of dozing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting and reading</td>
<td></td>
</tr>
<tr>
<td>Watching television</td>
<td></td>
</tr>
<tr>
<td>Sitting inactive in a public place (e.g. a cinema or meeting)</td>
<td></td>
</tr>
<tr>
<td>As passenger in a car for &gt; 1 hour</td>
<td></td>
</tr>
<tr>
<td>Lying down to rest in the afternoon when circumstances permit</td>
<td></td>
</tr>
<tr>
<td>Sitting and talking to a companion</td>
<td></td>
</tr>
<tr>
<td>Sitting quietly after an alcohol-free lunch</td>
<td></td>
</tr>
<tr>
<td>In a car, while stopped briefly in heavy traffic</td>
<td></td>
</tr>
<tr>
<td><strong>Total Epworth Sleepiness Score</strong></td>
<td></td>
</tr>
</tbody>
</table>

If the score is 16 or more, assessment by a sleep physician is required.

(The Epworth Sleepiness Scale is reproduced with the permission of Dr M.W. Johns, A new method for measuring daytime sleepiness: the Epworth sleepiness scale. Sleep, 14(6):540-545.)
2.4  Endocrinology

2.4.1  Introduction

This section details the assessment of pilots, other aircrew members and air traffic controllers who suffer or who may suffer from endocrine disease or from metabolic disorders.

The aim of the endocrine assessment within the aeromedical examination is to ensure that applicants do not suffer from endocrine or metabolic conditions which place them at an increased risk of incapacitation or which may produce a decrement in physiological or psychological function sufficient to jeopardise the safety of air navigation. In conducting the aeromedical examination, the DAME will recognise that an individual who holds an unrestricted medical certificate must be capable of performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities may include flight (either as a private or professional pilot):

- For prolonged duration, often as part of a shift roster
- Subject to disrupted sleep and time zone changes
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning

A number of these stressors may also affect Air Traffic Controllers.
2.4.2 The Endocrine Standard – CASR Part 67

The endocrine standards are found in the following paragraphs of CASR Part 67:

CASR 67

For medical standard 1

CASR 67.150(7)
Table 67.150
1.16

For medical standard 2

CASR 67.155(7)
Table 67.155
2.15

For medical standard 3

CASR 67.160(7)
Table 67.160
3.15

For Medical Standard 1:

“A person suffering from diabetes mellitus may be assessed as meeting medical standard 1 if the condition is satisfactorily controlled without the use of any anti-diabetic drug.”

For Medical Standard 2:

“A person who suffers from diabetes mellitus may be assessed as meeting medical standard 2 if:

a. The condition is satisfactorily controlled without the use of any anti-diabetic drug;
or
b. If an oral anti-diabetic drug is used to control the condition:
   i. The condition is under on-going medical supervision and control; and
   ii. The oral drug is approved by CASA.”

For Medical Standard 3:

“A person who suffers from diabetes mellitus may be assessed as meeting medical standard 3 if:

a. The condition is satisfactorily controlled without the use of any anti-diabetic drug;
or
b. If an oral anti-diabetic drug is used to control the condition:
   i. The condition is under on-going medical supervision and control; and
   ii. The oral drug is approved by CASA.”
2.4.3 Assessment of the Endocrine System

All applicants for Australian aviation medical certificates are required to complete a comprehensive screening questionnaire, to be physically examined by a DAME, and to undertake urinalysis for the presence of urinary glucose. In addition, applicants for Class 1 and Class 3 medical certificates are required to undergo fasting blood glucose estimation at the same time as they undergo five-yearly fasting lipid estimation. (CASA intends to introduce a requirement that applicants for Class 2 medical certificates will also be screened five yearly for diabetes mellitus by means of fasting blood glucose estimation).

When conducting an aeromedical examination, the DAME should note the presence of relevant risk factors for the development of endocrine or metabolic diseases and the presence of signs and symptoms suggestive or diagnostic of such conditions. Where such an endocrine condition is confirmed, evidence of secondary pathology or of accompanying complications should be sought and documented.

For example, risk factors for the development of diabetes mellitus include:

- Ethnic group
- Age >55 years
- Positive family history
- Obesity or significant overweight
- Abnormality of glucose tolerance
- Pregnancy
- Hypertension, dyslipidaemia, or clinical macrovascular disease
- Lack of regular exercise
- Use of diabetogenic medications.

Evidence of pathology secondary to diabetes mellitus may include vascular disease, retinal disease or renal disease.
2.4.4 Diabetes Mellitus and Impaired Glucose Tolerance

The incidence and prevalence of diabetes mellitus (of all types) has increased considerably in Australia in recent years. Up to 7.5% of the population now meets the diagnostic criteria for the condition (see Biochemical Investigations below). This is significant for aviation safety as diabetes mellitus is disqualifying for certification for aviation and air traffic control duties. The major aeromedical risk of diabetes relates to incapacitation (either overt or subtle), while it is also a major independent risk factor for a number of other incapacitating conditions—for example, stroke, acute myocardial infarction.

However, there is provision in the Civil Aviation Regulations for ‘a person who suffers from diabetes to be assessed as meeting the medical standard if the approved person conducting the relevant examination is satisfied that the diabetes is satisfactorily controlled without the use of an anti-diabetic drug’ or, for Class 2 and 3 medical certificate applicants, ‘where an oral anti-diabetic drug (approved by the Director of Aviation Medicine) is used to control the condition, the person provides evidence that he or she is undertaking on-going supervision and control of the condition’.

Classification of Diabetes Mellitus

Diabetes/diabetes precursor conditions are conventionally classified into four major types:

- Type 1 (absolute reduction in insulin production)
- Type 2 (resistance to the effects of insulin)
- Gestational
- Impaired glucose tolerance/impaired fasting glycaemia.

The majority of Type 1 diabetes mellitus sufferers use insulin regularly to manage the condition. Sufferers of Type 2 diabetes mellitus utilise a variety of management strategies: diet, oral hypoglycaemic agents and insulin, either singly or in combination.

Approximately one third of patients diagnosed with impaired glucose tolerance will subsequently have their glucose biochemistry return to normal, one third will continue to have impaired glucose tolerance and the remainder will eventually become sufferers of frank diabetes. Of aeromedical concern is the finding that all persons with impaired glucose tolerance have a statistically significant increase in their risk of developing ischaemic cardiovascular disease.
Biochemical Investigations

For medical certification purposes, any clinical suspicion of diabetes mellitus (such as urinalysis showing the presence of glycosuria) should be confirmed biochemically.

CASA recognises the following biochemical criteria, documented on at least two separate days, as confirming the diagnosis of diabetes mellitus:

- Fasting venous plasma glucose >6.9 mmol/l (less than 5.5 mmol/l—diabetes unlikely)
- Casual (random) venous plasma glucose >11.1 mmol/l (less than 5.5 mmol/l—diabetes unlikely).

Equivocal results of a fasting venous plasma glucose or casual venous plasma glucose estimation (between 5.5 and 6.9 mmol/l fasting or between 5.5 and 11.0 mmol/l casual) may indicate impaired glucose tolerance. In the event of an equivocal blood glucose result, DAMEs should order a 75 gram oral glucose tolerance test performed according to WHO 1999 guidelines and assessed according to the criteria in Table 2.4-1.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Criteria—Venous plasma Glucose concentration (mmol/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes mellitus</td>
<td></td>
</tr>
<tr>
<td>• Fasting value</td>
<td>≥7.0 or</td>
</tr>
<tr>
<td>• 2 hr post glucose load</td>
<td>&gt;11.1</td>
</tr>
<tr>
<td>Impaired glucose tolerance</td>
<td></td>
</tr>
<tr>
<td>• Fasting value</td>
<td>&lt;7.0 and</td>
</tr>
<tr>
<td>• 2 hr post glucose load</td>
<td>7.8–11.0</td>
</tr>
<tr>
<td>Impaired fasting glucose</td>
<td></td>
</tr>
<tr>
<td>• Fasting value</td>
<td>6.1–6.9 and</td>
</tr>
<tr>
<td>• 2 hr post glucose load</td>
<td>&lt;7.8</td>
</tr>
<tr>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>• Fasting value</td>
<td>&lt;6.1 and</td>
</tr>
<tr>
<td>• 2 hr post glucose load</td>
<td>&lt;7.8</td>
</tr>
</tbody>
</table>
Other Investigations

All applicants for medical (re-)certification who have either diabetes mellitus or impaired glucose tolerance must also provide to the DAME the results of all glycosolated haemoglobin (HbA1c) estimations performed in the previous twelve months. A minimum of three estimations is required, with the most recent being performed no more than one month prior to DAME examination. (HbA1c results should be reported in % HbA1c and should indicate the laboratory reference range for the estimations.)

In addition, CASA requires the following information and test results from applicants with diabetes mellitus:

- A recent report (within three months) from an endocrinologist or specialist physician:
  - Current status of control of diabetes
  - Whether the applicant has any history of hypoglycaemia/hyperglycaemia in preceding 12 months.
  - If so, whether there was any requirement for external intervention or assistance.

- A copy of the applicant’s diary of ambulant blood glucose monitoring throughout the three months immediately prior to DAME examination. Desirable ranges are:
  - No readings below 2.8 mmol/litre
  - At least 90% of values between 5.5 mmol/litre and 10 mmol/litre.

- A copy of the applicant’s most recent annual ophthalmological assessment detailing:
  - Clinical status
  - Visual acuity (with and without correction)
  - Presence of retinal disease
  - Presence of other ophthalmic pathology.

- A copy of a recent cardiovascular assessment by a cardiologist or specialist physician, including results of resting ECG and interval Stress ECG. The report should detail:
  - Clinical status
  - Presence and control of risk factors—for example, hypertension, smoking, hyperlipidaemia (total cholesterol, LDL and HDL)
  - Assessed risk of any acutely disabling cardiovascular event.

- The result of recent renal function tests, including 24 hour urine protein excretion.

- Certification that the applicant has completed and understood a course of diabetic management education.

There are no specific requirements for applicants who have impaired glucose tolerance or impaired fasting glycaemia where these conditions have not progressed to frank diabetes mellitus. However, CASA advises DAMEs to counsel affected applicants on the potential aeromedical certification consequences of their progression to frank diabetes mellitus and to initiate or refer them for appropriate clinical management.
Medical Certification of Persons with Diabetes Mellitus

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

Requirements for medical (re-)certification are set out in the following paragraphs.

1. Persons with diabetes mellitus controlled by diet may receive medical certification at Class 1, 2 or 3 provided they meet the following criteria:
   - Evidence of stable blood glucose control:
     - Glycosolated Haemoglobin (HbA1c) taken within one month of assessment <7.5%.
   - Satisfactory reports as detailed under Other Investigations
   - Absence of complications that could result in sudden or subtle incapacitation when exercising the privileges of a licence.

2. Persons with diabetes mellitus controlled by diet and oral hypoglycaemic drug(s) may receive unlimited medical certification at Class 2 or 3 levels only. Such persons who seek Class 1 (re-)certification may be offered (re-)certification with an ‘as or with copilot’ restriction. Prior to their (re-)certification, CASA requires objective evidence that these applicants meet the following criteria:
   - No unacceptable side effects from drugs
   - Evidence of stable blood glucose control
     - No episode of symptomatic hypoglycaemia during the preceding 12 months
     - Glycosolated Haemoglobin (HbA1c), taken within preceding month <7.5%
     - Satisfactory reports as detailed in the previous section, Other Investigations
   - Absence of neurological, cardiovascular, ophthalmological, renal or other complications of diabetes mellitus that could result in sudden or unpredictable incapacitation when exercising the privileges of a licence.

3. Persons with diabetes mellitus who require insulin treatment do not meet the mandatory medical standards and are not fit for medical certification. However, in appropriate cases, the Director of Aviation Medicine may exercise discretion and issue a Class 2 medical certificate endorsed with the conditions ‘as or with co-pilot only’ and ‘valid in Australian airspace only’. Prior to such certification, CASA requires:
   - Evidence of stable blood glucose control
     - No episode of symptomatic hypoglycaemia requiring intervention by others in the preceding 12 months
     - Serial Glycosolated Haemoglobin (HbA1c) estimations at two month intervals over the preceding 6 months—all results <7.5%
     - Satisfactory reports as detailed in the previous section, Other Investigations
Absence of neurological, cardiovascular, ophthalmological or renal complications of diabetes that could result in sudden or unpredictable incapacitation when exercising the privileges of a licence.

**Special Glucose Level Monitors**

Individuals with diabetes mellitus who receive aeromedical (re-)certification must possess and use a memory chip glucose meter for ambulatory blood glucose monitoring. The meter, together with a readily absorbable source of glucose, must be carried by the applicant while exercising the privileges of a licence. (When real-time ambulatory glucose monitoring becomes readily available in Australia, CASA may require this form of monitoring instead of monitoring with memory chip glucose meters.)

**Change in Treatment**

When an applicant’s oral hypoglycaemic medication is changed, or when its dosage is changed, he or she must not exercise the privileges of an aviation licence until the attending medical practitioner supervising the medication is satisfied that he or she is again stable and a DAME has recertified his or her fitness in accordance with CASA’s relevant medical standards.

**2.4.5 Thyroid Disorders**

The major aeromedical concern accompanying thyroid disease is the potential for abnormally high or low levels of thyroid hormone to affect an applicant’s cognitive function. Thyroid tumours have the potential to cause local symptoms or to metastasise to critical locations.

**Investigation**

Clinical suspicion of thyroid disease should be confirmed by appropriate investigations. These may include various imaging techniques, the use of fine needle biopsy, and biochemical thyroid function studies. CASA requires the results of thyroid function tests to establish that applicants are euthyroid prior to consideration for medical (re-)certification.
Medical Certification of Applicants Suffering from Thyroid Disorders

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. Requirements for medical (re-)certification are set out in the following paragraphs.

Goitre

Persons with goitre are acceptable for medical certification provided that there is no evidence of thyroid dysfunction nor of vascular or airways obstruction.

Hypothyroidism

Persons who are hypothyroid may be medically certificated provided Thyroid Function Tests (TFTs) demonstrate that adequate replacement therapy has been instituted and control maintained. TFTs should be performed annually for the first three years following initial diagnosis and periodically thereafter, as determined on a case-by-case basis, with serial results submitted with requests for medical re-certification.

Hyperthyroidism

Persons diagnosed as suffering from hyperthyroidism may be recertified once they are stable after surgery/isotope treatment/stable on medication and TFTs demonstrate that they are euthyroid. TFTs should be performed annually for the first three years after treatment is instigated and periodically thereafter, as determined on a case-by-case basis, with serial results submitted with requests for medical re-certification.

Thyroid Cancers

Thyroid cancer is disqualifying under Civil Aviation Regulations (1988). Persons diagnosed with thyroid cancer are obliged to refrain from performing licensed duties until they have been reviewed by CASA and a clearance to resume duties has been issued. While prognosis for cancer depends on many factors\(^1\), in most cases of thyroid cancer CASA will require documentation of successful removal of the tumour, completion of any subsequent radiotherapy, and the absence of metastatic disease before considering an applicant for (re-)certification. Under certain circumstances, conditional certification may be offered to pilots suffering metastatic disease.

\(^1\) These factors include the type of cancer, the stage of disease when discovered, the aggressiveness of the individual cancer, cell type, the types of treatment available, co-existing diseases and the general health of the individual.
2.4.6 Gout/Hyperuricemia

Gout and hyperuricaemia arouse aeromedical concerns because of the potentially incapacitating effect of acute symptomatic gout, and of the potential for high serum levels of uric acid to lead to symptomatic urolithiasis.

Investigation

Clinical suspicion of gout/hyperuricaemia should be confirmed by appropriate investigations, which may include estimations of serum uric acid levels and of urinary excretion rate. CASA will require the results of these investigations prior to considering an affected applicant for medical (re)certification. In the event that an applicant with gout suffers from abdominal pain, he/she should be investigated to exclude renal stone.

Medical Certification of Applicants Suffering from Gout/Hyperuricaemia

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

CASA will certificate applicants with gout/hyperuricaemia when the condition is satisfactorily controlled (either by diet or by allopurinol) and has been asymptomatic for at least one month. Applicants should not exercise the privileges of a licence when being treated with colchicine.

2.4.7 Hypothalamic and Pituitary Disorders

Pituitary Adenoma

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

Persons with pituitary adenoma will be assessed as unfit. Subsequent medical certification will depend on considerations of residual tumour, effects of raised intracranial pressure, any pressure effects on the optic chiasm, the effects of surgery or other treatment, the effects of any hormone excess or deficiency, and the effects of any drug therapy. In some instances, an applicant may be certificated with restrictions and appropriate surveillance following special medical assessment. Annual review, including reports from an endocrinologist or specialist physician and from an ophthalmologist, will be required.
2.4 Endocrinology

2.4.11 Diabetes Insipidus

On diagnosis, inform the CASA Aviation Medicine Section and advise the applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

This condition is marked by polyuria resulting from failure of vasopressin secretion. Fluid deprivation tests are diagnostic. Treatment is with vasopressin or one of its analogues. After the treated condition has been stable for a minimum of six months, applicants may be medically certificated with restrictions and appropriate surveillance. All such cases require special medical assessment, and CASA will determine aeromedical certification, when appropriate, on a case-by-case basis.

2.4.8 Adrenocortical Disorders

Disorders of adrenocortical metabolism have the potential to incapacitate or impair the ability of a pilot or ATC to perform duties. In addition, the underlying causes of adrenocortical disorders may themselves have significant aeromedical implications.

Medical Certification of Persons Suffering from Adrenal Disorders

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

- Aeromedical disposition will depend on cause and nature of adrenal disorder. Each applicant will be considered on a case-by-case basis and full documentation will be required. Applicants should be clinically stable and adequately treated clinically for a minimum of three months before being considered for certification.
- Cushing’s Syndrome secondary to malignancy or ectopic ACTH secretion is disqualifying. Applicants with other causes may be certificated once the underlying disease has been effectively treated and hormonal status has returned to and been maintained within normal range for a minimum of three months.
- Applicants with Addison’s disease may be certificated once their underlying disease has been effectively treated and their endocrine status has returned to and been maintained within normal range for a minimum of three months.
2.4.9 Parathyroid Disorders

Parathyroid disorders and associated disorders of calcium metabolism have the potential to impair a person’s ability to control an aircraft or to act as an Air Traffic Controller. Hyperparathyroidism leading to hypercalcaemia increases the risk of renal stone formation, peptic ulcer, mental changes and cardiac arrhythmia. (Hypercalcaemia due to malignancy should be excluded in such cases.) The less common hypoparathyroidism, if associated with hypocalcaemia, may cause disabling neuromuscular irritability and abdominal cramps.

Investigations

Prior to (re-)certification of an applicant with parathyroid disease, CASA requires a report from an endocrinologist or specialist physician and copies of pre- and post-management serum calcium and PTH levels\(^2\). If the applicant has suffered abdominal pain, CASA requires the results of imaging performed to exclude renal stones. Histology reports of specimens and the results of investigations to exclude underlying malignancy will assist in determination of the applicant’s fitness for medical (re-)certification.

Medical Certification of Persons Suffering from Parathyroid Disorders

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

- Applicants with hyperparathyroidism due to parathyroid adenoma may be (re-)certificated without condition(s) three months after surgical removal of the adenoma, provided that hormone and calcium levels have returned to and been maintained at normal levels. Hypercalcemia due to malignancy must be excluded. Full clinical details are required.

- Applicants with hypoparathyroidism may be (re-)certificated when estimation of hormone and calcium levels demonstrates that they have been stable on treatment (calcium and/or Vitamin D analogues) for at least three months.

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2 Note that poor venepuncture technique may lead to spurious PTH and calcium results.
2.4.10 Hyperlipidaemia

Hyperlipidaemias are an important risk factor for the development of coronary artery disease, stroke and heart failure, which are important potential causes of in-flight incapacitation. Control of lipid levels is an important mechanism for reducing the risk of in-flight incapacitation due to vascular mishap. Similar considerations apply in the case of ATC staff.

**Investigation**

Blood for lipid estimation (including total cholesterol, HDL, LDL and glucose) should be drawn after fasting—that is, after the applicant has had nothing to eat or drink except water for 12-14 hours. Abstinence from alcohol for several days prior to the test may lower triglycerides levels. Dietary changes in the few days before testing have little effect on lipid levels.

**Medical Certification of Persons Affected by Hyperlipidaemia**

- Persons with elevated cholesterol/triglyceride levels controlled by dietary means and/or nutritional supplements are not of medical concern to CASA.
- CASA is primarily concerned over the potential for lipid lowering drugs to cause side effects of aeromedical significance. CASA will certificate pilots (both Class 1 and 2) or ATCs taking any of the lipid lowering drugs currently available on prescription in Australia, provided the applicant tolerates the medication well and experiences no significant adverse side effects. A minimum of one month of ground testing is required before the applicant returns to flying/controlling duties.
- Lipid estimation is part of CASA’s cardiovascular risk management program. Should a Class 1 or Class 3 medical certificate holder be found to have an annual risk of cardiovascular event greater than 1% (currently a score of 15 or more points on CASA’s cardiovascular risk assessment tool), he/she will be required to undergo a stress ECG per CASA protocol.
2.4.11 Obesity

Obesity, defined for CASA’s purposes as a BMI >35, is of medical concern because:

- It is an independent risk factor for the development of vascular disease
- The physical dimensions of the obese person may reduce a pilot’s ability to manipulate an aircraft’s controls safely, or to escape in the event of an accident or incident.

**Investigation**

Applicants who have a BMI >35 must be assessed by a DAME, who is to seek evidence of other pathology secondary to the obesity. Obese pilots will be required to demonstrate their ability to control an aircraft safely and to escape in the event of an emergency as part of their certification assessment. This may involve undertaking a CASA directed operational flight/ground check.

**Medical Certification of Obese Applicants**

Obesity per se is only of concern to CASA from an air safety perspective if an applicant suffers from another aeromedically significant disease or condition secondary to the obesity or his/her physical dimensions affect the safe exercise of the privileges of a licence. Such applicants will be assessed on a case-by-case basis. Obese applicants who are otherwise well and can exercise the privileges of a licence safely will be certificated without restriction.

2.4.12 Anorexia

Adult applicants with a BMI <18.5 may suffer from an eating disorder. Prior to certification, a DAME should assess them to exclude such disorders. See section 2.6 Psychiatry.

2.4.13 Appetite Suppressants

CASA will not authorise pilots to fly or ATCs to perform ATC duties when taking any appetite suppressant medication.
2.5  Neurology

2.5.1  Introduction

This section on neurological disorders outlines some of the major categories of neurological diseases that are commonly encountered and indicates their aviation medical significance.

2.5.2  Nervous System Standard – CASR Part 67

CASA 67.150  For medical standard 1  CASA 67.150
   Table 67.150
   1.7  –  1.8

CASA 67.155  For medical standard 2  CASA 67.155
   Table 67.155
   2.7  –  2.8

CASA 67.160  For medical standard 3  CASA 67.160
   Table 67.160
   3.7  –  3.8
2.5.3 Headache

Nearly all applicants have experienced headache. The diagnosis of primary headaches are not discrete and the different types should be considered to be part of a continuous spectrum ranging from Muscular Tension Headache at one end to Classical Migraine at the other. Secondary headaches from other conditions eg, Cranial Neuralgia, Temporal Arteritis should be considered separately.

When considering primary headaches it is important to assess the history according to:

- **Speed of onset**: Is there warning eg, aura or no warning?
- **Period of prodrome**: seconds, minutes or hours?
- **Frequency**: isolated or recurrent, if recurrent how often. Time off work is a useful guide.
- **Neurological symptoms**: aura (crippling or just perceived), photophobia, visual changes, paraesthesia, paralysis, dysphasia etc.
- **Severity**: need for acute and intensive intervention such as parenteral opiate analgesics, degree of incapacitation such as need for bed rest vs ability to continue complex tasks.
- **Treatments and their effectiveness**: How effective prophylaxis if used. Type of acute treatment used eg, Tryptins and speed of response and any significant side effects.
- **Precipitating factors**: such as diet, oral contraceptive etc and effect of avoidance or withdrawal of such factors.

Since objective investigations will most usually negative, a detailed history is essential. The best history is obtained at first presentation.

**Migraine**

For strict diagnostic purposes, migraine is an acute but reversible transient cerebral vascular insufficiency phenomenon and headache is not necessary the most important component. When the vascular insufficiency effect predominates it should be distinguished from transient ischaemic attacks. In the worst case migrainous stroke can occur where the implication for flight duties is similar to that for stroke.

Beware of Atypical Migraine without headaches.

In common usage, the term migraine may refer to any headache, but there are two main types — common migraine and classical migraine.
Common Migraine (Migraine without Aura)

More than 80% of migraine sufferers experience "common" or "non-classical" migraine, which is not associated with sharply defined neurological disturbances.

It is often a label used for Tension Headache perceived to be of significant severity by the patient. Careful history will avoid the diagnosis of migraine with its implication vs. Tension Headaches.

Diagnosis of "nonclassical" migraine depends on:

- Detailed history of headaches
- Usually an absence of significant neurological symptoms.

Treatment usually does not include parenteral opiates or specific migraine drugs such as vascular active agents.

Classical Migraine

Classical migraine is accompanied by any transient focal neurological and/or vascular phenomena that may include:

- Unilateral headache
- Hemiparesthesia, Hemiplegia
- Retinal/Occipital phenomena, such as visual disturbance of various degree and scotomata
- Basilar artery phenomena
- Autonomic symptoms of nausea, vomiting etc.

Such migraines have variable periods of remission and rate of onset, and may completely incapacitate the sufferer. There is no universal exclusion of medication. Significant side effect should be explored and their presence or absence documented.

Adverse factors for aeromedical certification include:

- Sudden significant neurological symptom such as loss of vision, weakness and incoordination with no warning
- Failure or of prophylactic treatment with frequent attacks
- Requirement for intensive treatment
- Short prodrome that does not allow effective use of acute treatment before symptom onset.

The Aviation Medicine Section considers all cases individually.
Cluster Headache

Cluster headache is a subgroup of vascular headaches where the frequency of occurrence has a characteristic “cluster” nature. Aeromedical certification assessment considerations are similar to those for migraine. The details of history required are the same.

Other Types of Headache

Tension (Muscle Contraction) Headache

This category of headache can assume the nature of a vascular headache with a pulsating quality when it is severe and is often confused with migraine.

It includes headaches occurring secondary to other conditions that gave rise to muscular tension, e.g. eyestrain, cervical pathologies, psychiatric conditions in which management of the underlying cause is of prime importance.

Chronic tension headaches that require treatment such as anxiolytics or other drugs likely to cause a decreased state of alertness or diminished performance require specialised assessment.

Cranial Nerve Headache

The commonest of these conditions is trigeminal neuralgia. This may be idiopathic or secondary to underlying disease. Irritation of the nerve may be relieved by surgical intervention, which requires specialised neurosurgical assessment. Consideration must be given to the risk and implication for certification associated with any neurosurgery. The side effects of medications commonly used in its treatment include diminished judgement and diminished depth perception. Relevant history should be elicited and documented.

The Aviation Medicine Section assesses all cases individually.

Local Cranial Disease

Temporal arteritis

This condition need not be disqualifying if controlled, particularly when steroid therapy has been ceased. Full specialist reports are required for assessment.

Adverse factors associated with it include loss of vision and intracerebral involvement with significant functional sequelae.

The Aviation Medicine Section assesses all cases individually.
2.5.4 Blackouts, Loss of Consciousness and Syncope

These words are often used interchangeably by both laymen and medical professionals. A detailed description is more informative than the label. It does not necessary describe loss of consciousness (LOC) but can be used to mean an altered state of consciousness, vertigo or even psychiatric disturbance such as fugue-like states. Causes can be primarily neurological, secondary to cardiovascular pathology, gastrointestinal upset, physiological or even be specific to aviation causes such as G induced loss of consciousness.

History of the event is paramount in differentiation of the causes. The applicant should be directed to relive the experience in his/her own words, without prompting. Only when that is established should more direct questions about the circumstances before, during and after the event be asked. The patient’s account of sensations should be elicited. Observer history should be obtained if available. If uncertainty exists, record the uncertainty rather than introduce attempts at explanation. Such factual records allow further independent evaluation where necessary. The value and accuracy of the history deteriorates with time and repetition of recounting.

Specific features that will help in differentiating the physiological system involved are:

- **Prodrome**: absence or present.
- Posture at the time of the episode.
- **Period**: ie, duration of attack.
- Postictal orientation.
- Activity before, immediately and within 24 hr preceding.
- Head trauma.
- Frequency.
- Urinary incontinence.
- Tongue biting.
- **Observer report**: confirmation of patient’s account, particularly concerning convulsive movements. Time course to any convulsive movement is important ie, did it occur at the same time as LOC, or seconds later?
- **Bystanders’ action**: eg, promptly placing patient in prone or coma position, or keeping patient sitting/upright.
- Family and/or past history.
- Known cardiovascular history or risks.
- History of infection such as recent viral infection that may support labyrinthitis.
Depending on the historical features elicited, the need for referral to relevant specialist/s can be determined. If the cause is primarily neurological, refer to neurologist or neurosurgeon for clarification. For possible cardiovascular causes, cardiologist opinion should be sought. Where the history suggests vestibular problem, ENT opinion will be appropriate.

The Aviation Medicine Section assesses all cases individually.

**Concussion**

The term should be restricted to brief LOC in the setting of blunt head injury with no demonstrable intracranial injury. The emphasis is on the brief duration, which should be in the order of 5 minutes or less. If the event accords with these criteria and no sequelae are reported, it is generally of no significance for aeromedical certification. An exception is made for repeated concussions such as occur in boxers.

**Transient Global Amnesia (TGA)**

The cause of TGA is uncertain. It may be first warning of TIA. Current theory considers it to be a transient, migraine-type of vascular phenomenon. The condition should be distinguished from epilepsy, particularly complex partial epilepsy and symptomatic intracranial tumours.

Relapse can occur and may be precipitated by exercise, coitus, or exposure to water. A period of observation is necessary to monitor relapses. Risk of relapse is 30% and can recur once or twice. Where frequent attacks are present, other diagnoses should be considered.

The condition is benign and affected applicants can be aeromedically certificated following a suitable period of observation. Neurological reports are required in all cases and follow up reviews may be necessary.
2.5.5 Disorders of Equilibrium

**Benign Positional Vertigo**

This is a true rotational sensation accompanied by nystagmus, occurring only on change of head position. It is usually idiopathic or secondary to head trauma. Its course is variable. Assessment is based on the frequency of occurrences, their duration and severity.

**Acute Peripheral Vestibulopathy (Vestibular Neuronitis and Acute Labyrinthitis)**

Diagnosis implies temporary unfitness to fly. If the condition settles without recurrence, a return to unrestricted flying may be permitted after three months.

**Menière's Disease and Acute Recurrent Positional Vestibulopathy (ARPV)**

In these conditions, vertigo usually lasts for hours and often causes chronic disequilibrium. Menière's disease and ARPV have high recurrence rates. Applicants with these conditions are usually unable to meet the standard for certification, but require individual assessment.

**Alternobaric Vertigo**

In this condition, vertigo occurs on change of air pressure, often after a forceful Valsava manoeuvre to clear the ears. Oscillopsia and nystagmus may accompany it.

Occasionally this condition is due to chronic eustachian tube compression (e.g. by hypertrophied adenoids) and may thus be surgically correctable. Recurrent cases are assessed individually.

**Momentary Vertigo**

This is generally considered to be benign unless there is evidence that it significantly affects the applicant.

**Non-Functioning/Hypo-Functioning Labyrinths**

This condition is characterised by unsteadiness of gait, by loss of orientation (particularly in the dark) and by inability to maintain accurate visual fixation while in motion. It is often secondary to aminoglycoside administration. The degree of functional impairment should be fully investigated for decision by the Aviation Medicine Section.
**Vestibular Imbalance**

Applicants with this condition may experience feelings of unsteadiness on rapid change of position. It is generally benign and a "pass" assessment may be issued.

**Multisensory Dizziness**

This is a chronic condition of loss of balance or feeling of light-headedness in persons with multiple sensory disorders, such as a combination of two or more of:

- Peripheral neuropathy
- Vestibular imbalance
- Visual impairment
- Cervical spondylosis, and
- Hearing loss.

Multi-sensory dizziness is assessed according to the degree of disability present.

**Note:** Drugs used to control dizziness and vertigo often produce drowsiness. Control of these symptoms by drugs with such side effects is not acceptable for pilot or ATC medical certification. See also Section 2.13 Medication – Drugs and Flying/Controlling
2.5.6 Seizure Disorders

**General**

The tendency towards epileptic seizures is not an “all or nothing” phenomenon. Most people, under certain conditions, may have a seizure if sleep deprived or withdrawing from alcohol or benzodiazepines, especially if in addition they are taking medications that decrease the seizure threshold (e.g. tricyclic antidepressants). Approximately 2% of the population have a seizure during their lifetimes.

Following a single seizure, an adult has a 30-40% chance of recurrence. Those with a distinct epileptiform abnormality on the EEG, in the setting of a history of seizure, as opposed to non-specific abnormalities, have an increased risk of further seizures.

**Diagnosis**

It is imperative that there be an accurate diagnosis of the type of seizure. The importance of a description of the event cannot be overemphasised. While a useful diagnostic tool, any EEG must be reviewed by an experienced reader and must be evaluated in the context of the clinical history. It is not a useful sole diagnostic or screening tool.

The important components to the diagnosis are:

- More than one event, except Post Traumatic Epilepsy (PTE) for which one event will establish the diagnosis
- Must be unprovoked.

Video-EEG confirms the diagnosis but is not easily available as it is time consuming and difficult to organise except in academic research facilities.

**Aeromedical certification considerations**

A detailed history and specialist neurologist opinion is essential. Provoking factors must be considered. Their absence suggests a poor prognosis.

Significant adverse factors are:

- Unavoidable concomitants of aviation eg, strobe lights, propeller flicker, fatigue
- Difficult to avoid eg, menstruation.

Provoking factors that are avoidable or insignificant in context of aviation are:

- Alcohol excess and/or withdrawal
- Sleep.
These should be considered with regards to risk of occurrence in the absence of such factors.

Individuals with established epilepsy, ie, more than one unprovoked attacks, are unfit for aviation medical certification. Persons who have experienced seizures but who are not diagnosed as epileptic may be deemed to meet the medical standard.

**Partial (Simple or Complex) Seizures without progression to Generalise Seizures**

The term Partial Seizure often misleads patients to consider the condition is not as significant as the classical Grand Mal Seizure. Careful counselling of patients should include the explanation that such terms are anatomical and electro-physiological distinctions. The functional effect of impaired conscious state and/or brain activity is equally as significant as in other epilepsy.

**Sleep (Nocturnal) Epilepsy**

Epilepsy that occurs only when asleep is distinguished from sleep disorders such as Sleep Behaviour Disorder, Sleep Apnoea etc. Such disorders must be excluded. Sleep EEG recordings—best with video recording (if possible), will confirm the diagnosis.

The condition is associated with increased risk of seizure when awake ie, progression to the more “classical” type of epilepsy. This risk is increased when the condition is untreated.

Since aircrew and air traffic controllers are not performing flight-related duties when asleep, sleep as a provoking factor is not relevant in the aviation context. When the condition responds to anticonvulsants, the risk of such a seizure during flight related duties is further reduced.

Prior to certification, the effect of anticonvulsant control failure or “breakthrough” must be considered. Expert neurological opinion should be sought to determine if such a control failure occurs. The first presentation may be recurrence of sleep epilepsy or epileptic seizure whilst awake. Recurrence that first presents as fits whilst awake poses a flight safety hazard.

Aviation Medicine Section assesses all cases individually.

Important indicators of less risk are:

- No further occurrence of sleep epilepsy
- Absence of significant side effects of anticonvulsant.
**Childhood Seizures**

Childhood febrile seizures that are brief, not associated with neurological deficits and have ceased before the age of five are not generally disqualifying. The applicant must have been off all anti-epileptic medications for at least five years and the off-medication EEG, should be normal.

The seizures of Benign Rolandic Epilepsy of Childhood usually involve the face, tongue or hand and are often precipitated by drowsiness or sleep. The EEG shows significant abnormalities from the Rolandic area. Individuals with this condition may be considered for certification if they have been seizure free and off medication for ten years. They must have a normal neurological examination and EEG. A sleep deprived EEG should also be obtained and must be normal prior to issue of any aviation medical certificate.

Petit Mal or Juvenile Myoclonic Epilepsy is seizure disorders that occur in childhood. Because such conditions may persist into or present during adulthood, they are considered as subtypes of epilepsy. These conditions are associated with a risk of progression to generalised convulsions.

**The Single Epileptiform Seizure**

Extreme care must be taken to diagnose epileptic seizure in the presence of a single event. Clonic movements from transient brain hypoxia or from other causes are often reported as seizures. The condition should be considered as Loss of Consciousness (see above section on Blackouts, Loss of Consciousness and Syncope). Non-epileptic causes should be sought and excluded.

An individual with a single epileptiform seizure is initially unfit for medical certification. A case may be reconsidered five years from a seizure if the following conditions are met:

- Specialist neurological examination is normal
- Repeated EEGs, including sleep-deprived EEGs, do not reveal any significant abnormalities
- Studies incorporating additional nasopharyngeal or minisphenoidal electrodes, if relevant, do not reveal any significant abnormalities
- Neuro imaging, preferably by MRI, has demonstrated normal brain structure.

For continued medical certification five years after initial certification or recertification, all of the above investigations must be repeated and reported as normal. Applicants for Class 1 certification may be restricted to "as or with co-pilot" for a further two years. Individuals who have a second seizure are considered to have epilepsy.
When a single seizure was related to alcohol withdrawal, applicants may be considered for medical certification earlier if they have a normal EEG and Neuro imaging, and psychosocial and biochemical evidence is presented that their alcohol abuse is in a continuing "recovery" phase. The alcohol abuse should be dealt with as a separate medical problem.

Those who have had a seizure while on tricyclic antidepressant drugs or other seizure enhancing medications should be considered more prone to seizures than the average population. Both neurological and psychiatric opinions should be sought to manage their interrelated problems. Psychiatric report should indicate the optimum treatment required and if alternative treatment is suitable and/or available. The neurological report should indicate the applicant’s risk of further seizures, particularly if using other psychotropic medication for psychiatric treatment.
2.5.7 Head Injuries

There are two major concerns over fitness for aviation-related duties following head trauma. One is the neuropsychological consequence of the trauma in applicants who have not had any clear focal deficits and the other is the possibility of Post Traumatic Epilepsy (PTE).

The neuropsychological consequences are secondary to the effects of acceleration/deceleration forces on the skull and brain. Because of the anatomy involved, these forces cause their greatest focal damage to the orbital, frontal and anterior temporal areas of the brain. Diffuse white matter damage may be associated with the cortical damage.

The result of such injury is dysfunction in a number of functional executive activities of the brain. Frequent effects include:

- Slowing of reaction time, impaired memory and decreased ability to maintain a high level of performance over time, particularly in settings of complex activities and choices,
- A high propensity for further mental decline with fatigue, and
- Other problems include maintaining attention, initiation and proper sequencing of tasks, difficulty in planning and anticipating, and difficulty in establishing automatic responses to a trigger.

The affected individual may not notice or care that the task is being poorly performed. Stress, fatigue and pain may exacerbate all these effects, and the handling of simultaneous emergency tasks is particularly affected.

Although the effects of head trauma may be severe, routine IQ and mental status testing may be within normal limits. Fortunately there is a natural tendency for neurological deficits to improve with the passage of time. There are a number of ways to predict the outcome of a head injury. The most commonly used is the duration of post-traumatic amnesia (PTA). Serial sequential neuropsychological tests separated by months or years can document changes associated with improvement of neurological deficit. A pre-trauma baseline test of such nature will provide the ideal reference but is not usually available.

The limitations of neuropsychological testing should be recognised eg, learning; subjective interpretations by the tester, interface issues (particularly if computer-based) and its results should be interpreted with these limitations in mind.
**Mild Brain Injury**

This is characterised by:

- Transient loss or alteration of consciousness without any focal neurological deficit and with rapid return to alertness and orientation
- Post-traumatic amnesia (PTA), which occurs when a person is conscious but ongoing events are not recorded in the memory. The duration of this lapse must be less than one hour; and
- Post-traumatic syndrome (PTS) which comprises a symptom complex involving:
  - Dizziness
  - Emotional impairment
  - Intellectual impairment, and
  - Headache.

Applicants with mild brain injury are generally considered to be fit to fly unless there is a history of PTS, which takes more than six months to resolve.

Any alteration of consciousness associated with head trauma is a sufficient indicator of likely brain injury that flying should not be undertaken for at least two weeks — the period during which "early" post traumatic epilepsy is most likely to occur.

Even in the absence of other risk markers or of a neurological deficit, a more prolonged loss of consciousness and its associated post-traumatic amnesia should be followed by longer periods of suspension from aviation related duties, as follows:

<table>
<thead>
<tr>
<th>PTA</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 HR</td>
<td>1 month</td>
</tr>
<tr>
<td>1 HR - 24 HRS</td>
<td>3 months</td>
</tr>
<tr>
<td>&gt; 24 HRS</td>
<td>At least 1 year</td>
</tr>
</tbody>
</table>

In all cases, formal confirmation of neurological fitness should precede a return to flying and referral to the Aviation Medicine Section for a final decision is required.

**Moderate and Severe Brain Injury**

The significant factors in the assessment of head injuries, which produce moderate or severe brain injury, are:

- Extent and nature of any neurological deficit
- Risk of post-traumatic epilepsy (PTE).
2.5.8 Post-Traumatic Epilepsy Markers

A past history of febrile convulsions in childhood and/or a family history of epilepsy doubles the risk associated with any other markers.

Early post-traumatic epilepsy that occurs within the first week following injury carries a 25% risk of later epilepsy. Convulsive movements that accompany an impact head injury do not increase this risk. However, any convulsive activity following the immediate effects of impact, however shortly thereafter these occur, should be considered as "early post-traumatic epilepsy".

Demonstrated haemorrhage within the brain substance, particularly the cortical part, is associated with 25-45% risk of PTE. Depressed fractures or presence of blood in the subarachnoid space are not reliable guides to risk of PTE. However, the presence of such findings should alert investigators to search for bleeding within the brain substance.

Both CT scan and MRI are desirable in assessment of such bleeding. Availability dictates which test is performed. MRI has the advantage of being able to grade breakdown products from blood and can be very sensitive for late imaging where no initial CT or MRI was performed. Where possible an initial CT and/or MRI should be performed. If the history suggests a severe head injury and no initial imaging available a MRI should be performed to detect residual changes associated with bleeding within the brain substance.

A normal MRI should be reassuring.

Other markers are the presence or absence of a post-traumatic amnesic interval of more than twenty-four hours, focal signs, and early post-traumatic epilepsy.

Once the first post-traumatic week (the period of early PTE) has passed, the risk of subsequent PTE decays exponentially. By two years, the residual risk is less than 20% of that immediately post-injury and at four years it is less than 10% of that initially present.

When considering recertification, a residual risk of PTE of 1% or less is acceptable, given that the prevalence of epilepsy in the community is 0.33%.

Conditions that require careful assessment and which most commonly result in a "fail" assessment are: epilepsy, intracerebral haematoma, persisting CSF fistula, primary open cerebral laceration, and the presence of any significant permanent neurological deficit.
Recertification Guidelines

The Aviation Medicine Section applies the following guidelines:

1. Applicants with PTA lasting 30 minutes or less, who after the event have a normal neurological examination and no sequelae, may return to full duties in three to four months if the CT scan is normal.

2. Applicants with PTA from 30 minutes to 24 hours, with a normal MRI and EEG, are acceptable after 12 months. If a seizure occurred in the first week after trauma in an adult, a longer interval before re-licensing is required. Such cases are assessed individually.

3. If there is PTA greater than 24 hours, but Neuro imaging and neuropsychological testing are normal, applicants can be declared fit after two years. Flight simulator testing may provide additional valuable information in these cases.

4. Applicants with head injuries associated with intracerebral haemorrhage or focal deficit, whose neuropsychological testing does not show significant sequelae at 5-7 years post trauma, may return to duties after 7 years. Those who demonstrate abnormal neuropsychological sequelae have been more seriously injured and are considered individually. MRI is essential to determine presence or absence of bleeding.

5. Use of an anticonvulsant may mask the presentation of any PTE. The duration of the seizure free period should be considered as beginning only when applicant is off anticonvulsant medication. Where the risk of further seizures is considered to be too high to cease medication, the applicant is not medically fit for certification.

2.5.9 Neurosurgery

Opening the skull is not necessarily a permanently disqualifying factor for flight crew or ATC certification.

Assessment is based on:
- The underlying disease and its prognosis
- Any neurological deficit
- Surgical approach and any associated induced injury to the brain substance along the approach path
- Any risk of post operative epilepsy secondary to destruction or removal of cerebral tissue
- Location of the supratentorial/infratentorial lesion.

Full reports are required in all cases. DAMEs should issue a “doubtful” assessment and provide explanatory notes.
2.5.10 Cerebrovascular Diseases

These pathologies are usually secondary to or associated with other medical conditions and these should be sought and controlled besides dealing with the presenting cerebrovascular events. Investigations are more informative regarding the causes than the history alone. Imaging by CT scan, MRI or Angiography will differentiate the various types. Other investigations such as lipid profile, stress test for coronary ischaemia, ultrasound of carotid and heart, digital subtraction angiography etc should be considered to address non-cerebral conditions. The treatment of these non-cerebral pathologies may introduce factors affecting aeromedical certification, eg, use of an anticoagulant.

Specialist neurologist assessment is mandatory. Opinion should specifically include the risk of:

- recurrence
- epilepsy
- subtle or acute incapacitation.

Such assessment should be supported by reference to current literature with reasoned opinions.

Where subtle functional changes are suspected, neuropsychological testing to quantify the changes should be undertaken. These tests can be expensive and are open to varying interpretations.

Ischaemia

Assessment of transient ischaemic attacks (TIAs) and reversible ischaemic neurological deficits (RINDs) depend upon their causes.

- **Stenosis.** Although stenotic lesions may be bypassed or treated by endarterectomy, the risk of continuing TIAs and cerebral infarction remains high.

- **Embolism.** The risk of recurrent embolism or of haemorrhage secondary to anticoagulation is high.

- **Postural.** Individual assessment is required, but most instances are related to head movements necessary for flying.

- **Vascular headache.** See earlier section on Headache.

- **Blood hyperviscosity.** This condition may be due to polycythaemia, myelomatosis, Waldenstrom's macroglobulinaemia, etc. These cases are assessed individually and usually result in "fail" assessments if the hyperviscosity cannot be controlled.

- **Hypertension.** If adequate control is established with the use of suitable drugs, these applicants may be considered fit.
All precipitating or associated pathologies should be addressed and separate reports relevant to them included.

Aviation Medicine Section assesses all cases individually.

**Haemorrhage**

There are two major types of cerebral bleeding:

- Intracerebral haemorrhage, producing cerebral infarction
- Subarachnoid haemorrhage.

Most cases are secondary to leakage or rupture of an aneurysm; some are secondary to arterio-venous malformation. Surgery to treat them may cause injury to brain matter with associated post-operative epileptic risk. Details of the surgery should be included in reports.

20% have no identifiable cause but may be related to sustained hypertension or to transient elevation of blood pressure.

All affected patients are at risk of later developing normal pressure hydrocephalus with visual field loss and corresponding subtle incapacitation. This possible complication should be looked for and excluded as part of the follow up of all affected applicants.

Aviation Medicine Section assesses all cases individually.

**Cerebral Infarction**

Applicants who have suffered a cerebral infarct are generally considered unfit for at least one year. Recertification depends on:

- Underlying pathology leading to the stroke
- Absence of neurological deficit
- Risk of recurrence
- Assessed risk of future seizures.
2.5.11 Infections of Central Nervous System

Meningitis

All applicants diagnosed with meningitis should not engage in flight duties for six months. Return to flight duties depends on the nature of the infecting agent or cause of meningitis, eg, viral, bacterial or fungal, and the degree of recovery of resultant deficit and risk of development of epilepsy or hydrocephalus.

Encephalitis

This is dealt with as for meningitis.

Brain Abscess

Assessment is based on the underlying cause and whether the lesion is:

- Supratentorial, in which case the risk of epilepsy and the degree of deficit must be considered, or
- Infratentorial, where the nature and degree of deficit must be considered.
2.5.12 Degenerative Disease

Dementia

Dementia is defined as deterioration in cognitive abilities that impair the previously successful performance of activities of daily living. The examining doctor is in a better position to assess an applicant with possible dementia if there has been contact over some years and changes over time can be more readily appreciated.

Memory loss, particularly short term, is most common and tends to affect executive function. (Planning, initiation and regulating behaviour for systematic, goal-directed activity. It is highly involved in novel situations where long term memory “experience” is not adequate).

In the aviation medical examination, presentation of dementia tends to occur at early stage in the process, with consequently difficult diagnosis. Pathologies that cause secondary dementia should be sought and excluded before a diagnosis of primary dementia is made. Age of onset is not a reliable guide. With aging, frequency of all pathology increases. Dementia, primary or secondary, is one of the many manifestations of increasing age. In the absence of pathology, even advanced age is not a reason for refusal of medical certification.

In early dementia, diagnosis usually is made by exclusion. Where a positive finding is present eg, brain atrophy on CT scan, the diagnosis is more likely. However, the absence of such findings does not preclude the diagnosis. Investigations should be guided by pathologies that produce secondary dementia.

Clinical examination can be formal or informal. Abnormal performance of tasks such as form completion, or following simple instruction such as undressing should be recorded. Mini-Mental State Examination has limitations because of its dependence on the applicant’s linguistic ability, educational level and cultural background, particular in the early and late stages of the condition. Other reasons for poor test performance should be carefully considered before the result deemed positive. If test performance is normal, the presence of dementia is unlikely.

The greatest diagnostic challenge occurs where formal tests appear normal yet a family member or the examiner’s prior knowledge of the applicant indicates the presence of changes in mentation sufficient to cause concern. A flight performance report from instructors should be sought. Formal flight test may be necessarily. Assessment of flight performance must take account of the pilot’s experience and currency. Highly experienced pilots may perform adequately even when mildly impaired. Comparison with previous performance or with that of other pilots’ with similar experience should be sought.

Many dementias are progressive but some may be static. Where dementia has been demonstrated to be progressive, an immediate "fail" assessment is likely.
2.5 Neurology

Note: If dementia is secondary to metabolic disease or correctable organ failure, there may be significant recovery of mental function following effective treatment. Aviation Medicine Section assesses all cases individually.

Normal Pressure Hydrocephalus

Treatment is not effective in preventing progression and subtle incapacitation may develop even in the presence of a working shunt. Assessment will be "fail".

2.5.13 Extrapyramidal Disease

Parkinsonism

This is characterised by:

- Rigidity
- Bradykinesia
- Tremor—although a "resting" tremor eases with movement, stress may produce a "reversal" with worsening of tremor on movement.

Parkinsonism can be a manifestation of other diseases and such causes should be sought and dealt with. Parkinson’s disease is a chronic, progressive disorder of primary Parkinsonism with no evidence of more widespread neurological involvement.

The functional effects of Parkinsonism can be variable. A careful record of neurological deficits, including effect on common activities, should be made. This will serve both as a quantitative appraisal tool and for comparison in evaluating subsequent progression of the condition.

A flight test is an essential component of evaluation. It should be the last of the tests performed and does not replace clinical assessment.

Applicants may be assessed as fit for certification if there is no adverse effect of treatment such as postural hypotension or "on-off" phenomena, and if the following features are adequately controlled:

- Bradykinesia
- Rigidity
- Tremor
- Adjustment of centre of gravity
- Voice quality
- Rapid scan eye movement.
Significant sequelae relevant to aviation safety include:

- Altered colour vision
- Dementia (late phenomenon)
- Depression (early as reaction to diagnosis, or later as a primary phenomenon)
- “On-off” phenomenon: abrupt but transient fluctuation in clinical state within the day, often as complication of levodopa therapy.

Progression to incapacitating symptoms or signs is generally slow. Shortened validity of certification is required to facilitate monitoring of changes. Class 1 certificate holders may require 6-monthly review and restriction to duties ‘as or with co-pilot’. All classes of medical certificate holders will require neurological review at least annually.

Applicants receiving treatment who display "on-off" phenomena will not be certificated to continue flight duties due to the likelihood of rapid onset of incapacitation within the time period of a typical flight.

### 2.5.14 Demyelinating Disease

**Multiple Sclerosis (MS)**

MS is characterised by multiple episodes of demyelinating attacks within the central nervous system. Diagnosis cannot be made following a single attack unless confirmed by MRI changes. A single attack with a single lesion on MRI does not confirm the diagnosis. Multiple lesions in the clinical setting of single attack may be consistent with the diagnosis.

The course of the disease can be relapsing-remitting or progressive. In the relapsing-remitting type some patients may remain static for many years while some will relapse at variable frequency. Favourable prognostic features are: isolated optic neuritis or other sensory change, complete recovery, age of onset younger than 40 years, female, fewer than two relapses in the first year of illness and minimal impairment five years after the first presentation.

Progressive type of MS has a 50% probability of functional deficit in daily life activities requiring assistance at 10-15 years from initial diagnosis.

Typical attacks in mild cases have onset over days rather than minutes. However in severe cases, attacks can present as an acute neurological event. Seizure is uncommon.
In all cases, assessment depends upon:

- Nature of symptoms
- Time between exacerbations
- Residual deficit
- Likelihood of sudden incapacitation
- Activity of the disease.

A flight test may be necessary to determine the effect of any residual deficit.

All cases of MS require formal neurological opinion. Aviation Medicine Section assesses all cases individually.

Any subsequent certification will require regular specialist reviews.
2.5.15 Intracranial Tumours

(See also Section 2.14 – Malignancy.)

Three factors affect the aeromedical disposition of applicants with intracranial tumours:

- Malignant or benign
- Treatment modality: chemotherapy, radiotherapy, surgery
- Degree of brain involvement.

Certification of applicants with secondary malignant brain tumours is principally a function of the characteristics of the primary tumour.

Certification of applicants with primary malignant brain tumours depends on prognosis in terms of malignancy and sequelae of any treatment received.

Certification of applicants with benign brain tumours depends on tumour size and location and the effect of any treatment.

Radiotherapy

Whole brain irradiation may be associated with late radiation injury effects. Focal irradiation may cause residual changes demonstrated on MRI. Such complications should be monitored for and excluded.

Chemotherapy

Systemic effects have to be considered in any aeromedical assessment.

Surgery

Effects occur regardless of the tumour’s malignancy. For tumours within the brain, aeromedical concerns are for brain substance loss, with associated neurological deficit, and surgically induced bleeding into brain substance, with associated post-“traumatic” epilepsy.

Essential factors for consideration are:

- **Site of tumour:** supra or infratentorial
- Surgical approach
- Details Of The Surgery: amount of intraoperative bleeding, retraction and compression of brain, and any intraoperative difficulties or complications.
The treating neurosurgeon’s report and opinion on the risk of epilepsy is a mandatory requirement for aeromedical assessment and must include:

- Details of any neurological deficit from brain substance loss or as result of surgical approach
- Risk of epilepsy
- Risk of recurrence of tumour.

Benign tumours not involving brain substance such as meningioma or acoustic neuroma should be considered in terms of:

- Treatment used: radiation and/or surgery
- Severity of compression effect on underlying neural structure: brain or nerve. In respect to brain compression, the potential for epilepsy should be considered.

A report from the specialist involved is required in all cases.

The effect of different treatment combinations and their likely sequelae requires expert neurological opinion on the particular therapy.

If there is no significant neurological deficit, these applicants may be assessed as fit for pilot and ATC duties. Applicants with small tumours, with no significant deficit after treatment by cryotherapy, after which there has been no evidence of epilepsy, may be assessed as meeting the required medical standard or as posing no significant risk to the safety of air navigation.

Applicants with history of childhood cerebellar astrocytoma who have been cured and who have no deficit or history of epilepsy may be assessed as meeting the required medical standard or as posing no significant risk to the safety of air navigation.

For adult subtentorial tumours, Aviation Medicine Section assesses all cases individually.

Nasal approach to pituitary tumours has a low risk of sequelae; the primary aeromedical consideration is endocrine effect and any residual compression effect on the optic nerves.

Malignant tumours fully excised, with or without associated radiotherapy, are considered according to their potential for recurrence, effect of the treatment, and their associated seizure risk. Those treated by radiotherapy alone will require long period of observation, usually in order of years, before the condition can be considered cured. Early certification is unlikely.

Applicant with benign tumours treated by radiation alone will be considered individually, dependent on the siting and any residual pressure effects on surrounding structures.

Benign intraventricular tumours will be considered individually, with any neurological deficit resulting from the surgical approach the main consideration.
2.5.16 Extracranial Neurological Disease

*Peripheral Nerve Diseases*

These disorders are assessed on the basis of the nature and degree of deficit. Autonomic involvement may produce syncope and is generally regarded as incapacitating. Full reports are required.
2.6 Psychiatry

2.6.1 Introduction

This section details the assessment procedures for pilots, other aircrew members and air traffic controllers (ATC) who suffer or who may suffer from psychological disorders or psychiatric disease.

The aim of the psychiatric assessment within the aeromedical examination is to ensure that applicants do not suffer from psychological disorders or psychiatric disease which places them at an increased risk of incapacitation, which may produce a decrement in psychological or higher cortical function, or which may jeopardise the safety of air navigation. A particular concern is the potential for an affected individual to commit an unsafe act that impairs the safe operation of an aircraft.

When conducting the aeromedical examination, the DAME should recognise that an individual who holds an unrestricted medical certificate must be capable of safely performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities (either as a private or a professional pilot) may include flight:

- For prolonged duration, often as part of a shift roster
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning
- Subject to disrupted sleep and time zone changes.

A number of these stressors may also affect Air Traffic Controllers.
### 2.6.2 The Psychiatric Standard – CASR Part 67

The psychiatric standards are found in the following paragraphs of CASR Part 67:

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2.6.3 Psychiatric Assessment

All applicants for Australian aviation medical certificates are required to complete a comprehensive screening questionnaire, to be physically examined by a DAME, and to undertake a number of screening tests.

When conducting the psychiatric component of the aeromedical examination, the DAME should note the presence of relevant risk factors for the development of psychiatric disease and the presence of signs and symptoms suggestive or diagnostic of such conditions. (A Generic Template for an Aviation Psychiatric History is being developed to guide the conduct of an aviation medical psychiatric assessment and will be provided in due course.)

For example, risk factors for the development of alcoholism include:

- Family history of alcohol abuse
- Family or work stresses
- Financial pressures
- Single marital status.

Psychometric testing may assist in making a psychiatric diagnosis and referral to a consultant psychiatrist may be indicated to confirm a diagnosis or to resolve concern over a differential diagnosis. CASA may require a pilot or an ATC to be assessed by a consultant psychiatrist as part of its consideration of an applicant’s fitness for aeromedical certification.
2.6.4 Documentation of Psychiatric Conditions

Psychiatry is a subjective science. DAMEs need to take a careful and thorough clinical history before reaching a psychiatric diagnosis, particularly a diagnosis that may have significant occupational implications for pilots or ATCs. The Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations is provided to assist DAMEs in taking such a history and to bring consistency to their reporting.

In addition to requiring a traditional narrative report of psychiatric illness in aviators, CASA will henceforth require DAMEs and consultants to classify psychiatric conditions in aircrew and ATCs in accordance with the criteria defined in the Diagnostic and Statistical Manual of the American Psychiatric Association (DSM IV). Use of the DSM system will provide CASA with a tool to ensure the uniform assessment of all aircrew and ATCs diagnosed with psychiatric disease and allow CASA to make an informed assessment of the aeromedical risk posed by a particular applicant with a psychiatric condition.

DSM IV categorises psychiatric disorders and disease along several axes:

- **Axis I - Clinical syndromes**
- **Axis II - Developmental Disorders/Personality Disorders**
- **Axis III - Physical Disorders and Conditions**
- **Axis IV - Severity of Psychosocial Stressors**
- **Axis V - Global Assessment of Function**.

The first three axes constitute the diagnostic assessment of a patient with a psychiatric condition. Conditions in Axis I (and to a lesser extent Axis II) are those most likely to be of aeromedical concern in the flying safety context. Axis III permits the clinician to indicate any current physical disorder or condition that is potentially relevant to the understanding or management of the case. (These are disorders or conditions listed outside the mental disease section of ICD 10).

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1 CASA does not require an Axis V assessment. An amended assessment scale for assessing function in Aviators is under consideration.
Axis IV provides a scale for coding the overall severity of the psychosocial stressor(s) acting upon the patient that have occurred in the year preceding the current evaluation and that may have contributed to the development, recurrence or exacerbation of a mental disorder. The rating of severity of the stressor should be based on the clinician’s assessment of the stress an “average” person in similar circumstances and with similar socio-cultural values would experience from the particular stressor(s). Clinicians should also make an assessment as to whether the stressors are acute (less than 6 months) or enduring (greater than 6 months).

Axis V permits the clinician to indicate an overall judgement of a person’s psychological, social and occupational functioning (as an aviator or ATC) on a scale that assesses mental health-illness. Two ratings should be made using this scale; the first an assessment of current function and the second an assessment of best function during the preceding 12 months.

Thus, for example, a DAME reporting on an airman with psychiatric illness may summarise his condition as follows (in addition to providing a narrative of the situation):

Axis I: Major depression: single episode, severe, without psychotic features
Alcohol dependence
Axis II: Dependent personality disorder
Axis III: Alcoholic cirrhosis of liver
Axis IV: Stressors: anticipated retirement; grounded by company; change of residence; loss of contact with friends
Axis V: (Not required by CASA at present.)
2.6.5 Disorders Diagnosed in Childhood

Mental Retardation

This disorder is characterised by significantly sub-average intellectual function with concurrent deficit or impairment in adaptive functioning. Onset is before the age of 18 years. Where the results of standardised, individually administered intelligence tests indicate significant reduction in an applicant’s intellectual performance likely to limit the individual’s ability to control an aircraft and where clinical assessment indicates a deficit in adaptive behaviour, CASA will not issue a medical certificate.

Learning Disorders

Learning disorders are diagnosed when an individual’s achievement on individually administered, standardised tests in reading, mathematics or written expression are substantially below that expected for age, schooling and level of intelligence and when such deficits interfere with academic achievement or activities which require such skills. CASA will not issue a medical certificate to an applicant who has a learning disorder that precludes the acquisition of knowledge and information essential to safe flight.

Motor Skills Disorders

The essential feature of this group of disorders is a marked impairment in the development of motor coordination sufficient to interfere with academic achievement of activities of daily living. Recognition of this disorder usually occurs in childhood. Clinical course in variable, and in some cases, lack of coordination continues through adolescence into adulthood. In general, CASA will not issue a medical certificate to an applicant who suffers an impairment of motor skill sufficiently severe to threaten the safety of flight.

Communication Disorders

CASA will not usually issue a medical certificate to an applicant who suffers a communication disorder severe enough to compromise effective communication in the aviation environment. Practical testing may be required to establish the effectiveness of an applicant’s communication abilities.
Pervasive Development Disorders

These disorders are characterised by severe and pervasive impairment in several areas of development relative to an individual’s developmental level or mental age. Autistic Disorder is the commonest of these disorders. The essential features of an individual with this disorder are impairment in reciprocal social interaction (which is gross and sustained), impairment in communication skills and markedly restricted repertoire of activity and interests. The symptoms and characteristics of autism can present in a wide variety of combinations, from mild to severe.

Other conditions in this group include Rett’s Disorder, Asperger’s Disorder and Childhood Disintegrative Disorder.

Sufferers of disorders in this group will usually be precluded from holding CASA medical certification.

Attention Deficit/Hyperactivity Disorder (ADD/ADHD) and Disruptive Behaviour Disorders

This disorder is amongst the most common neuro-developmental disorders found in children. Its hallmarks are hyperactivity, impulsiveness and inattention beyond the norm for a child’s age. There may be wide variations apparent in the severity of this disorder. Other psychiatric conditions frequently co-exist in children suffering ADD/ADHD. While the diagnosis is reliable if made to the criteria outlined in DSM IV, concerns over the validity of the diagnosis in a particular individual are frequently expressed. Sufferers of ADHD/ADD are significantly more likely to be involved in motor vehicle and industrial accidents (whether on pharmacological treatment or not) than similar groups of individuals who do not suffer from this condition(s).

Aeromedical concerns relate to the capacity of a sufferer of ADD/ADHD to safely control an aircraft and to the potential adverse effects of amphetamine medications frequently utilised to treat this condition. To consider an application for aeromedical certification from a sufferer of ADD/ADHD, CASA requires a thorough assessment of the applicant by a consultant psychiatrist (to confirm the diagnosis against the criteria indicated in DSM IV and exclude other conditions) and the results of neuropsychological testing. Where evidence exists of persisting deficiencies in cognitive ability, behavioural aberrancy or where an applicant requires continued use of amphetamine medication, the applicant will not be aeromedically certificated.

Refer to the Criteria for the Diagnosis of ADD/ADHD.
Conduct Disorder (Antisocial Personality Disorder of Childhood)

The essential feature of conduct disorder is a repetitive and persistent pattern of behaviour in which the basic rights of others or major societal norms or rules are violated. CASA will not usually consider certification for a medical certificate to an applicant with a substantiated history of conduct disorder.

Oppositional Defiant Disorder

The major feature of this condition is a recurrent pattern of negativistic, defiant, disobedient or hostile behaviour towards authority figures that often develops gradually in childhood and may continue into adolescence and even into adulthood. CASA will not usually consider medical certification for an applicant with a substantiated history of oppositional defiant disorder.

Tic Disorders

A tic is a sudden, rapid, recurrent, non-rhythmic, stereotyped motor movement or vocalisation. Tics may be simple or complex, may exist in isolation or be part of a condition such as Tourette’s Syndrome. Where an applicant's tic is believed to have implications for the safety of air navigation, CASA will not issue a medical certificate. Sufferers of Tourette’s Syndrome will usually be precluded from holding medical certification.
2.6.6 Delirium and Dementia

**Delirium**

Delirium is a disturbance of consciousness, accompanied by a change in cognition that is not due to pre-existing or evolving dementia. The disturbance generally develops over a short period, and often fluctuates during the course of a day. There is generally evidence from the clinical assessment of the aetiology of the delirium which may be due to a general medical condition, substance intoxication/withdrawal, use of medication, toxin exposure or a combination of these factors.

Aviators and ATCs with acute delirium should immediately be stood down/stand down from flying or controlling duty. CASA will only consider aeromedical certification once the applicant has recovered from the delirious state, and the underlying cause of the delirium has been identified and remedied.

**Dementia**

Dementias are characterised by the development of multiple cognitive deficits (including memory impairment and one or more of the following cognitive disturbances: aphasia, apraxia, agnosia, or a disturbance of executive functioning). While dementias share a common symptom presentation they may be differentiated on the basis of aetiology.

It may be difficult to make a diagnosis of early dementia in an individual who has enjoyed a well paid and responsible position in the aviation community for many years, but who is finding it impossible to learn new skills and to retain them (e.g. changing aircraft type). Anxiety or mood disorders may co-exist. Sympathetic handling and possibly psychological evaluation may prove helpful and the latter may be necessary to exclude or establish a diagnosis of pre-senile dementia. In such cases the decision about medical certificate revalidation will need to be based upon a very careful evaluation of all clinical and occupational information.

Once an applicant demonstrates a significant impairment of memory and other cognition, he/she should refrain from exercising the privileges of the pilot or ATC licence. CASA will not usually issue an aviation medical certificate to a sufferer of dementia.
2.6.7 Mental Disorders due to medical conditions not classified elsewhere

Reserved.

2.6.8 Substance Related Disorders

This group of disorders includes disorders related to the problematic use of a drug, including non-prescription medications, prescribed medications and drugs of abuse (e.g. alcohol, cocaine), other substances (e.g. volatile solvents) and to toxin exposure. For CASA purposes, this classification does not include nicotine abuse disorder. Some prescription drugs, whilst legally prescribable, are inappropriate when used by pilots or ATCs in the aviation environment (e.g. MS Contin). The safety of medications is dealt with in Section 2.13 Medication – Drugs and Flying/Controlling. The substance related disorders are divided into two major categories: the substance use disorders (abuse and dependence) and the substance induced disorders (substance induced intoxication, withdrawal, delirium, dementia, amnesia, psychosis, anxiety, mood, sexual dysfunction and sleep disorders). CASA will not usually issue an aviation medical certificate to a pilot or ATC who suffers a substance abuse disorder or who is involved in the problematic use of drugs.

Drug Testing

Current CASA practice is to ask all applicants for aeromedical certification (original and renewal), about possible problematic use of drugs and substances. DAMEs should also look for evidence of drug or substance use/abuse in their assessment of applicants.

Applicants who admit to the problematic use of drugs/substances or whom the DAME suspects of drug/substance abuse on the basis of other history or examination findings are required to submit a urine sample for drug screening. Urine samples for drug testing purposes should be provided as part of and at the time of the DAME medical certificate examination and should be passed under the direct supervision of the DAME. The sample should then be split into two clean containers and each sealed, the applicant being offered his/her choice of samples for independent testing. The other sample is to be forwarded to the testing pathology laboratory by the DAME. (Under no circumstances is this sample to be given to the applicant). Urine drug testing required by CASA is to undertaken at the applicant's expense.

As a minimum, urine samples should be tested for the following groups of drugs: cannabinoids, amphetamines, cocaine analogues, hallucinogens, opiates, sedatives and phencyclidine analogues. In addition, the requesting DAME should request testing for any other drug/substance that he/she suspects that the applicant may be using/abusing.

Any applicant who returns a positive urine drug screen and thus confirms his/her problematic use of drugs/substances does not meet the relevant medical standard. CASA will not issue a medical certificate unless an explanation acceptable to CASA is provided.
Alcohol Abuse/Alcoholism

A number of alcohol related syndromes are described:

- **Acute intoxication** with alcohol is a concern in the aviation workplace by virtue of the way in which it impairs psychomotor performance that may potentially lead to accidents and injury. The potential for catastrophic outcomes in the aviation environment arguably render it impossible to consider any episode of acute intoxication in a pilot on duty as “uncomplicated”. Current CARs provide specific requirements on “bottle to throttle time” for pilots and ATCS and it is intended that the new CASRs, when published, will limit the blood alcohol concentration of pilots and ATCs.

- **Harmful use of alcohol** is associated with damage to the physical or mental health of the individual; in the absence of a diagnosis of the alcohol dependence syndrome. Certain specific and severe consequences of alcohol misuse may also be diagnosed separately – notably alcoholic hallucinosis, Korsakoff’s psychosis and alcoholic dementia.

- The **alcohol dependence syndrome** is a cluster of biological, psychological and social phenomena that may be diagnosed where three or more of the following features are identified during the preceding year:
  - A strong desire/compulsion to drink
  - Difficulties in controlling drinking
  - A physiological withdrawal syndrome associated with abstinence
  - Increased tolerance to alcohol
  - Neglect of other activities due to drinking
  - Persistence of drinking despite harmful consequences.

- **Alcohol withdrawal** is associated with mild to severe symptoms, including sweating, nausea, tremor and anxiety. However, it may be associated with serious complications, including convulsions or delirium (“delirium tremens”).

- An isolated **drink driving offence** does not fulfil ICD-10 criteria for harmful use of alcohol (although it does fulfil DSM-IV criteria for alcohol abuse) and CASA will generally not take action in response to a single episode of PCA. However, such offences do indicate an increased probability that other alcohol related problems might be identified, and this probability increases still further where there have been multiple drink-driving offences committed.

**Note:** The FAA prohibits the medical certification of pilots who are convicted of two or more drink-driving offences within a 3-year period.
Medical Assessment

The experience of certain major airlines and licensing authorities is that success in rehabilitation of the alcohol dependent pilot can best be achieved by early intervention and treatment, adhering to the strict protocol outlined below. By using this program it has been possible to return aircrew to active flying within four months.

- **Immediate action.** A pilot or air traffic controller must be assessed as temporarily unfit on reasonable suspicion of:
  - intoxication whilst on duty
  - harmful use of alcohol
  - alcohol dependence
  - other alcohol related problems.

Such an assessment may be taken by the airline’s own medical officer, by the DAME or by CASA, or by a member of flight crew or operations staff.

Where a pilot is thought to be intoxicated whilst on duty, particular care and sensitivity are required and the specific action taken may depend, in part, upon the company drug and alcohol policy. However, where possible, it is important to obtain an objective assessment of the alleged intoxication at the earliest opportunity. This might involve use of a breath alcoholmeter, a blood alcohol analysis or urinary drug testing. Such procedures may only be conducted with the patient’s consent. Given that blood alcohol concentration falls fairly rapidly with abstinence, such testing should be conducted as soon as possible. Refusal of testing, and any reasons given for this, should also be recorded carefully. A period of less than 4 hours between detection and testing is considered usual.

- **Treatment and rehabilitation.** If psychiatric opinion and examination confirm “alcohol abuse with or without dependency”, then a residential in-patient program is a mandatory requirement if revalidation is to be considered. The treatment program undertaken should be directed by the treating psychiatrist and may or may not include pharmacotherapy.

Where the diagnosis is considered not to constitute “alcohol abuse with or without dependency” but where there is still a degree of concern regarding an alcohol related matter, then a less intensive treatment may be indicated. For example, such treatment may comprise a day-patient program, or outpatient counselling. The circumstances in which this may be offered must be a matter of judgement. (Arguably, heavy drinking as a cause of an elevated GGT or hypertension, but without any other complications or problems, might be an example of such circumstances.)
Follow-up and monitoring. DAMEs or CASA should be advised as soon as treatment is considered necessary so that follow-up review may be arranged to commence immediately following discharge from in-patient care. The patient should be reviewed immediately after discharge from in-patient care and on-going review should be at 3 monthly intervals (or more frequently if indicated) for at least 2 years, and less frequently thereafter. Overall monitoring should continue for not less than 3 years and in most cases will continue virtually indefinitely, or until the pilotretires. This is because of the significant risk of relapse, which continues for many years following treatment. Review will require supportive, corroborative evidence of continuing abstention from the family, the family doctor and from others in close contact at home or in the workplace. At each review blood tests should be repeated as support for the monitoring process (see above).

Continued attendance at Alcoholics Anonymous or an equivalent organisation is required in most cases. It is also desirable that a peer group member on the same aircraft fleet should act as a “buddy” to supervise the individual’s progress and report to the relevant authority at intervals.

Treatment goals. Total abstinence will usually be the only acceptable treatment goal. For less serious cases (e.g. an elevated GGT with no other evidence of problems arising from alcohol consumption), an attempt at controlling drinking may be allowed, and in such circumstances in-patient treatment will not be required. However, this will be the exception rather than the rule and, in cases of doubt, in-patient treatment and abstinen ce should both be considered essential for recertification.

Certification. At the end of the first four months of treatment, and provided that abstention is secure, the pilot may be allowed to resume his/her flying role but only in a multicrew capacity. A period of at least two years multicrew limitation will be required, assuming good progress, before solo operations will be authorised. Failure to enter the program or to maintain the protocol will lead to continued suspension of the medical certificate.

Recidivism. Recidivists will usually be disqualified from holding an aviation medical certificate and will not be considered for further certification.
Reinstatement of Aeromedical Certification

Applicants who are disqualified from holding an aviation medical certificate as a result of problematic use of drugs/substances (including alcohol) may subsequently be certified at any class provided they meet the following requirements:

a. The applicant completes a detoxification program (if relevant to the management of the drug/substance condition—eg, alcoholism)
b. The psychiatrist/drug rehabilitation specialist managing the applicant’s case assesses the applicant and provides a report confirming the applicant’s abstinence and prognosis
c. The applicant enters a program of random drug testing/performance assessment at the direction of CASA to confirm continued abstinence.
d. The applicant enters an appropriate peer support program
e. The applicant is regularly reviewed by a psychiatrist/substance abuse specialist and a report is provided to CASA 6 monthly (in the first year).

Applicants will not usually be granted medical certification within 12 months of diagnosis/disqualification for substance abuse. Applicants who have been treated for alcohol related conditions may be considered for medical certification 4 months after detoxification is complete.

Recidivism

Recidivists will usually be disqualified from holding an aviation medical certificate and will not be considered for further certification.
2.6.9 Schizophrenia and Psychotic Disorders

These disorders are grouped together as they frequently include psychotic symptoms as a prominent aspect of their presentation (“psychotic” refers to an “inability to test reality” as evidenced by the presence of delusions, prominent hallucinations, disorganised speech, disorganised or catatonic behaviour).

An established history of schizophrenia or psychotic disorder is an absolute contraindication to aeromedical certification of pilots and ATCs. Occasionally aircrew who can unequivocally be established to have experienced a temporary psychotic episode which, has ceased and is reasonably expected never to recur (e.g. psychosis secondary to an organic, toxic or metabolic cause) may be considered for certification. In such cases, certification will be based on psychiatric and other expert advice on the risk of recurrence.

Applicants and licence holders rarely inform CASA when they are diagnosed with schizophrenia or other psychotic illnesses. Such individuals may have little insight into their illness and may attempt to continue flying/controlling. DAMEs and other medical practitioners who are aware of a patient who holds a pilot or ATC licence and who is suffering from a psychotic illness should immediately notify CASA’s Aviation Medicine Section and, where appropriate, notify the medical certificate holder that this is being done. While this may be personally difficult, the risk posed to the safety of the public as well as to the individual by a psychotic medical certificate holder or applicant is such that notification of CASA is entirely appropriate. The Civil Aviation Regulations and the Civil Aviation Safety Regulations indemnify any medical practitioner who acts in good faith in such circumstances.
2.6.10 Mood Disorders

**Major Depression**

Major depressive disorder is characterised by a clinical course involving one or more episodes of major depression without a history of manic, mixed or hypomanic episodes. Major depressive disorder may have an extremely variable course with some patients experiencing episodes of severe depression separated by long periods without depressive symptoms of any sort, while other patients are entirely debilitated by their almost unrelenting condition. At least 60% of individuals who have a single episode of severe depression will experience further episodes, and 90% of individuals who have had three episodes of severe depression will have subsequent episodes. A significant aeromedical concern is the high mortality associated with this condition, as up to 15% of patients with major depression die by suicide.

However, major depression is also commonly relatively mild in its manifestation and readily treated. Assessment of the aviation risk is thus problematic and is based on considerations such as the worst state the patient has experienced during an episode and the suicide/homicide risk during their worst state. The presence of a significant risk at any time during the course of a depressive illness will be disqualifying for pilots and ATCs. A specialist psychiatric opinion should be sought in any case where there is uncertainty about patient status.

**Bipolar I Disorder (Mania with/without Major Depression)**

The essential feature of this disorder is a clinical course characterised by the occurrence of one or more manic episodes or mixed episodes. More than 90% of individuals who have an episode of mania will go on to have future episodes. Such individuals frequently suffer one or more episodes of major depression or other psychiatric co-morbidities. Completed suicide occurs in 10-15% of such patients.

Bipolar disorder is disqualifying for pilots and ATCs.

**Bipolar II Disorder (Hypomania with Major Depression)**

The essential feature of this disorder is a clinical course characterised by the occurrence of one or more major depressive episodes accompanied by at least one hypomanic episode.

Bipolar disorder is disqualifying for pilots and ATCs.
2.6 Psychiatry

Cyclothymic Disorder (Numerous Brief Episodes of Hypomania and Minor Depression)

The essential feature of cyclothymic disorder is a chronic fluctuating mood disturbance involving numerous periods of hypomanic symptoms and numerous episodes of depressive symptoms over a period of years (where neither hypomanic nor depressive symptoms are severe or prolonged enough to meet diagnostic criteria for a manic depressive episode). Cyclothymic disorder usually begins insidiously in adolescence and has a chronic indolent course into adulthood. Approximately 15% of sufferers will subsequently develop Bipolar I or II disorder.

Dysthymic Disorder (Prolonged Minor Depression without Mania/Hypomania)

The essential feature of dysthymic disorder is a chronically depressed mood that occurs on most days for several years. Affected individuals describe themselves as being chronically sad or “down in the dumps”. During periods of depressed mood, additional symptoms of depressed appetite, sleep disturbance, low energy levels, low self-esteem, poor concentration and feelings of helplessness may be present. Up to 75% of patients with dysthymic disorder will develop major depression within 5 years.

Pilots and Air Traffic Controllers with dysthymic disorder will not be certificated while they are symptomatic. On remission of symptoms, successfully treated applicants with a good prognosis may be certificated on the basis of a report from a consultant psychiatrist that indicates that the applicant is in remission and at low risk of behaviour that may compromise aviation safety.
Use of Antidepressant Medication by Depressed Pilots and Air Traffic Controllers

CASA may, on a case-by-case basis, certificate applicants who are prescribed (and are taking) the antidepressant medications Sertraline, Citalopram and Venlafaxine as treatment for their depression. CASA is reviewing the antidepressant Moclobemide for possible approval for use by aviators and ATCs. An “as or with co-pilot” or “with direct air traffic controller supervision” condition, as appropriate, may be imposed. Pilots and ATCs taking other types of anti-depressants will not usually be considered for certification. CASA certification of pilots and ATCs taking CASA authorised medications is conditional on:

- Such applicants being under the care of a medical practitioner experienced in the management of depression—the applicant must:
  - Be stable on an established and appropriate dose of medication for at least four weeks before returning to flying/ATC duties and exhibiting:
    - Minimal acceptable side-effects
    - No drug interactions or allergies
  - Be subject to clinical review monthly or more often, with progress reports to CASA at 6 monthly intervals (for at least the first year). The applicant may be involved in other concurrent treatment (e.g. psychotherapy).
  - Have an absence of other significant psychiatric co-morbidities
  - Have no other psychoactive medications
  - Have precipitating factors removed/controlled.

- Symptoms of depression being well controlled, without evidence of psychomotor retardation

- An absence of suicidal ideation or intent

- An absence of features of arousal (e.g. irritability or anger)

- The presence of a normal sleep pattern.

Pilots or ATCs authorised to fly or perform duties when taking Selective Serotonin Re-uptake Inhibitor (SSRI) or related antidepressant medications must cease exercising the privileges of their licences if their antidepressant medication is altered or the dose changed. Their supervising medical practitioner may return them to duty when they are assessed as stable and without unacceptable side effects.

Pilots and ATCs whose medication is being reduced must cease exercising the privileges of their licences for the entire period during which they are weaned off medication plus an additional period of two weeks. Their supervising medical practitioner may return them to duty when they are assessed as stable and without unacceptable side effects.
2.6.11 Anxiety Disorders

DSM IV has eliminated the term neurosis, and dispersed the diagnoses from this former category of disorders amongst four other headings:

- Mood disorders
- Anxiety disorders
- Somatoform disorders
- Dissociative disorders.

Because panic attacks and agoraphobia may occur in the context of any anxiety disorder as well as in association with other mental disorders, they are defined separately hereunder.

**Panic attacks**

Panic attacks are discrete episodes in which an individual experiences a sudden onset of intense apprehension, fearfulness or terror, often associated with feelings of impending doom. During these episodes, symptoms such as shortness of breath, palpitations, chest pain or discomfort, choking/smothering sensations, and fear of “going crazy” or losing control may be present. Attacks occur suddenly, may be unpredictable and usually build to a maximum within 10-15 minutes. CASA will not usually grant aeromedical certification to an individual who suffers non-specific or unpredictable panic attacks.

**Agoraphobia**

The essential feature of agoraphobia is extreme anxiety about being in places or situations from which escape may be difficult (or embarrassing) or in which help may not be available in the event of having a panic attack. The anxiety typically leads to a pervasive avoidance of a variety of situations. Such avoidance may impair an individual’s ability to work or to carry out other responsibilities. CASA may grant aeromedical certification where an applicant’s agoraphobia is unrelated to the aviation environment or unlikely to affect aviation safety adversely.

**Specific Phobia**

The essential feature of this disorder is a marked and persistent fear of clearly discernible, circumscribed objects or situations. Exposure to the phobic stimulus almost invariably provokes an immediate anxiety response. CASA may grant aeromedical certification where an applicant’s specific phobia is unrelated to the aviation environment or is unlikely to affect aviation safety adversely.
Social Phobia (Fear of Embarrassment)

This condition is marked by a significant and persistent fear of social or performance situations in which embarrassment may occur. Exposure to such situations almost invariably provokes an immediate anxiety response and may reduce an affected individual's ability to function in social and occupational circumstances. Most sufferers of this condition avoid these social/performance situations but some may endure such situations with dread. CASA will not usually grant aeromedical certification to an individual who suffers from non-specific or unpredictable social phobias.

Obsessive-compulsive Disorder (Obsessive Thoughts and Compulsive Rituals)

Obsessions are persistent ideas, thoughts, impulses or images that are experienced as intrusive and inappropriate and that cause marked anxiety or distress. Compulsions are repetitive behaviours or mental acts whose goal is to prevent or reduce anxiety or distress. In most cases, an individual with a compulsion feels driven to perform a compulsion to reduce the distress that accompanies the obsession or to prevent some dreaded event or situation. Eventually, the sufferer recognizes that the obsession or compulsion is excessive or unreasonable but feels powerless to prevent it. These disorders may cause marked distress, be extremely time consuming or significantly interfere with an individual's normal social or occupational circumstances. CASA will not usually grant aeromedical certification to an individual who suffers from obsessive-compulsive disorder.

Post-traumatic Stress Disorder (Non-acute Psychological Consequences of Previous Trauma)

The essential feature of Post-Traumatic Stress Disorder (PTSD) is the development of characteristic symptoms following exposure to an extremely traumatic stressor. Such stressors include a personal near death experience, witnessing the severe injury or death of another or the violent or unexpected death of a family member. An individual's response must involve intense fear, helplessness, or horror. The characteristic symptoms resulting from exposure to the extreme stressor include persistent re-experiencing of the trauma, avoidance of the stimuli associated with the trauma, numbing of general responsiveness and persistent symptoms of increased arousal. PTSD can occur at any age and symptoms generally begin within 3 months of the precipitating event. CASA will not usually grant aeromedical certification to an individual who is suffering from acute symptoms of PTSD. Certification may be considered once an individual's symptoms are controlled and the applicant is considered to pose no threat to the safety of air navigation.
2.6 Psychiatry

Acute Stress Disorder

This condition is characterised by the development of anxiety, dissociative or other psychological symptoms within one month of exposure to an extremely traumatic stressor. Generally symptoms of acute stress disorder begin shortly after exposure to the stressor, peak after 2-5 days, and resolve within a month (otherwise the diagnosis should be changed). CASA will not usually grant aeromedical certification while individual is experiencing an acute stress reaction. Once the condition has resolved, return to flying or ATC duties is likely.

Generalised Anxiety Disorder

In this disorder an individual is afflicted by excessive anxiety about a number of events or activities. The symptoms occur on the majority of days and the individual finds it difficult to control the symptoms. The anxiety and worry are accompanied by one of more of the following:

- Restlessness
- Easy fatigability
- Difficulty concentrating
- Irritability
- Muscle tension
- Disturbed sleep.

Many individuals suffering generalised anxiety disorder report they have been nervous and anxious all of their lives. The clinical course is chronic and fluctuating. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.
2.6.12 Somatoform Disorders

The common feature of this group of disorders is the presence of physical symptoms that suggest an underlying physical condition, but are not explained by that medical condition. The symptoms cause clinically significant distress or impairment in social, occupational or other areas of functioning and are not intentional.

**Somatization Disorder**

In somatization disorder, the patient experiences multiple symptoms including pain, gastrointestinal symptoms, sexual dysfunction and pseudo-neurological symptoms over several years. Characteristically, this disorder begins before the age of 30 and has a chronic fluctuating course that rarely remits completely. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Undifferentiated Somatoform Disorder**

The essential feature of this disorder is the presence of one or more physical complaints that persist for six months or longer. Symptoms include chronic fatigue, loss of appetite, gastrointestinal or genitourinary symptoms. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Conversion Disorder**

This disorder involves unexplained symptoms or deficits affecting voluntary motor or sensory function suggesting a neurological or other general medical condition. Psychological factors are judged to be associated with the symptoms or deficits. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Pain Disorder**

In pain disorder, the predominant focus of clinical attention is pain. Psychological factors have an important role in the severity, exacerbation or maintenance of this disorder. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Hypochondriasis**

This condition is the preoccupation with the fear of having, or the idea that one has, a serious disease based on a patient’s misinterpretation of bodily symptoms or functions. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.
2.6 Psychiatry

Body Dysmorphic Disorder

This condition is the preoccupation with an imagined or exaggerated defect in physical appearance (in contrast to anorexia and bulimia where the morbid focus is on body weight). CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

2.6.13 Factitious Disorders

Factitious disorders are characterised by physical or psychological symptoms that are intentionally produced or feigned in order to assume a “sick role”. In contrast to malingering, the motivation of sufferers of factitious disorders is psychological and there is an absence of external incentive for the behaviour. Other psychiatric co-morbidities are frequently present. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

2.6.14 Dissociative Disorders

The essential feature of this group of disorders is a disruption in the integrated functions of consciousness, memory, identity or perception. The disturbance may be sudden or gradual in onset, and may be transient or chronic. Dissociative amnesia, dissociative fugue, dissociative identity disorder, and depersonalisation disorder are included in this group of disorders. CASA will not usually grant aeromedical certification to an individual who suffers from these conditions. Aeromedical certification may be considered should the condition resolve.
2.6.15 Sexual and Gender Identity Disorders

**Sexual Dysfunctions**

This group of disorders is characterised by disturbance in sexual desire and in the psychophysiological changes that characterise the normal human sexual response. They may cause marked distress and interpersonal difficulty. In general, these disorders are not of aeromedical concern unless the associated psychological distress intrudes on an individual’s ability safely to control an aircraft or perform duty as an ATC.

**Paraphilias**

The essential feature of this group of conditions is recurrent, intense, sexually arousing fantasies, sexual urges or behaviours involving non-human objects, the suffering of oneself/others, or the non-consensual participation of others in such activities. Affected individuals are rarely self referred and usually come to attention when their behaviour has brought them into conflict with their sexual partners, society, or has reduced on their social, occupational or other areas of functioning.

Affected applicants will not usually be aeromedically certificated until the issues that brought them to attention have been resolved. Successfully treated applicants with a good prognosis may be certificated on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.

**Gender Identity Disorders**

Patients with gender identity disorder experience strong and persistent cross-gender identification and a persistent discomfort about their assigned sex. The diagnosis depends on evidence of clinically significant distress or impairment in social, occupational or other areas of functioning.

Affected applicants will not usually be aeromedically certificated until the source of the distress or impairment is dealt with, and if appropriate, gender reassignment has been completed. Successfully treated applicants with a good prognosis may be certificated on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.
2.6.16 Eating Disorders

**Anorexia Nervosa**

The essential features of this condition are refusal to maintain a minimally normal body weight, intense fear of gaining weight, and significant disturbance in perception of shape/size of the body. Restrictive and binging/purging subtypes of this condition are identified. Many persons with anorexia nervosa exhibit depressive symptoms, others may be obsessive-compulsive, while others may have feelings of ineffectiveness, a strong desire to control the environment, inflexible thinking, limited social spontaneity, perfectionism, restrained initiative and depressed emotional expression. While some persons recover from anorexia completely, others have a relapsing course and the overall mortality of this condition approaches 10%.

CASA will not usually aeromedically certificate applicants who are actively anorexic. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.

**Bulimia Nervosa**

The essential features of this condition are binge eating and use of inappropriate compensatory methods to prevent weight gain. Persons with bulimia also place an excessive emphasis on their body shape. They are frequently depressed or suffer mood disorders and many also meet the criteria for the diagnosis of personality disorder. The lifetime prevalence of substance abuse disorders involving alcohol or stimulants is at least 30% among persons with bulimia.

CASA will not usually aeromedically certificate applicants while they are actively bulimic. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.
2.6.17 Sleep Disorders

**Primary Sleep Disorders**

This group of disorders includes the dyssomnias (including insomnia, hypersomnia and narcolepsy which are characterised by abnormalities in the amount, quality or timing of sleep) and the parasomnias (characterised by abnormal behavioural or physiological events occurring in association with sleep). Of primary aeromedical concern is the failure of sufferers from these conditions to gain sufficient restorative sleep to ensure optimum alertness and cognitive function when performing duties as pilots and ATCs. Applicants for aeromedical certification will only be considered if studies confirm normal alertness during waking hours (with or without treatment). (Also see Section 2.3 Medical Aspects – Respiratory Disease.)

2.6.18 Impulse Control Disorders

The essential feature of impulse control disorders is failure to resist an impulse, drive, or temptation to perform an act that is harmful to the person or to others. CASA will not usually grant aeromedical certification to individuals who are diagnosed as suffering from such disorders.
2.6.19 Adjustment Disorders

An adjustment disorder may be identified when a person, within three months of an event or stress, develops clinically significant emotional or behavioural symptoms. Such symptoms are either greater than would be generally expected, given the nature of the stressor, or lead to significant impairment in social, educational or occupational function. Stressors may be single or multiple, recurrent or continuous, and may affect either a single person or a group. Patients with adjustment disorders may experience symptoms of depression, anxiety, or may manifest disturbances of conduct. Adjustment disorders generally have a good prognosis and usually remit within six months of the stressor or its consequences ceasing.

Pilots or ATCs should not exercise the privileges of a licence whilst suffering symptoms of an acute adjustment disorder. In some cases, a medical certificate may be suspended. Once psychiatric opinion confirms that the symptoms associated with the adjustment reaction have abated and the acute stressor has been removed or overcome, CASA will usually issue an unrestricted medical certificate.

Personality Disorders

Personality disorders are characterised by enduring patterns of thought and behaviour that deviate markedly from the expectations of a person’s culture. These patterns, which usually begin in adolescence or early childhood, are pervasive, frequently inflexible, stable over time and cause distress, social impairment and often occupational difficulties. A number of specific personality disorders are identified including: antisocial personality disorder; (impulsive, aggressive, manipulative); borderline personality disorder (impulsive, self-destructive; unstable), dependent personality disorder (dependent, submissive, clinging); Histrionic personality disorder (emotional, dramatic, theatrical); narcissistic personality disorder (boastful, egotistical, "superiority complex"); obsessive-compulsive personality disorder (perfectionist, rigid, controlling); paranoid personality disorder (suspicious, distrustful); and, schizoid personality disorder (socially distant, detached), etc.

While personality traits are unique and may enable a person to excel in a particular field, individuals with identifiable personality disorders are likely to have attitudes or perform acts that may be prejudicial to flight safety. Such individuals fail to meet CASA’s psychiatric medical standards and will usually be disqualified from aeromedical certification. Certification may be considered if specialist psychiatric opinion confirms that a pilot or ATC with a personality disorder represents a low risk to aviation safety.
2.6.20 Other Psychiatric Conditions which may be the Focus of Clinical Attention

**Suicidal Ideation or Gesture**

Suicide and attempted suicide are not psychiatric diagnoses per se, but rather symptoms of underlying psychiatric disease. Furthermore, it is uncommon for an individual to use an aircraft as a means of committing suicide.

Those who commit suicide are more often male. The act is carefully planned, precautions taken against discovery, and the method is often violent. The majority of those who suicides are suffering from a depressive disorder, many having significant social problems, and alcohol misuse is a feature in about 15% of cases. In the younger age groups personality disorders are frequently diagnosed, because they are often associated with alcohol or drug misuse, and adverse social factors. Deliberate self-harm is usually an impulsive act, committed in such a way as to invite discovery. Over dosage with minor tranquillisers, antidepressants and non-opiate analgesics is common. Frank major psychiatric illness is uncommon.

In assessing potential risk the following factors should be considered:

- A history of direct statement of intent
- A history of previous self harm
- A previous or current depressive disorder, particularly in the early phase of recovery
- Alcohol dependence, particularly with severe physical or social complications
- Drug dependence
- Social deprivation or loneliness.

Certification may be considered if specialist psychiatric opinion confirms that a pilot or ATC who has attempted or considered suicide represents a low risk to aviation safety. Applicants who have a history of multiple suicide attempts will not usually be granted a medical certificate.
Fear of Flying

DSM IV identifies as a true simple phobia the overt, unabashed, and long-standing fear of flying which usually occurs in people who are not aviators. When an experienced aviator who previously enjoyed flying presents with “fear of flying” it may represent a complex mix of more acute causes and symptoms' presentations. In such fearful fliers, anxiety about symbolic threats may overlay a rational fear of actual risks; this may represent a reaction to a near or actual accident, or displaced anxiety from a personal crisis. If the flier is not consciously aware of the fear, the focus may be on vague or trivial somatic symptoms, presented in a setting of "I'd like to fly, but—." This attitude presents a striking clinical contrast to the more usual tendency of fliers to understate, if not actually deny, signs and symptoms that they believe may disqualify them from medical certification.

An episode of spatial disorientation or of hyperventilation in flight may trigger intense symptoms of anxiety. Loss of motivation to fly may undermine previously adequate means of coping with the true dangers of flight, particularly in professional aviators. An accident involving the flier or a friend may overwhelm mental defences against such a possibility. Interpersonal conflicts with significant individuals in a non-aviation setting (home, office) may precipitate aviation-related anxieties without any obvious connection to flying except the time of onset.

Whatever its genesis, CASA will not medically certificate a pilot who suffers symptomatic fear of flying until its causes are delineated and the fear has been successfully treated.
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2.7.1 Introduction

This section details the assessment of pilots, other aircrew members and Air Traffic Controllers (ATC) who suffers or who may suffer from renal disease or from urological disorders.

The aim of the renal assessment within the aeromedical examination is to ensure that applicants do not suffer from renal or urological conditions which place them at an increased risk of incapacitation or which may produce a decrement in physiological or psychological function sufficient to jeopardise the safety of air navigation. In conducting the aeromedical examination, the DAME will recognise that an individual who holds an unrestricted medical certificate must be capable of performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities may include flight (either as a private or professional pilot):

- For prolonged duration, often as part of a shift roster
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning, and
- Subject to disrupted sleep and time zone changes.

A number of these stressors may also affect ATCs.
2.7.2 Urinary Standard – CASR Part 67

The urinary standards are found in the following paragraphs of CASR Part 67:

| CASR 67.150 | For medical standard 1 | CASR 67.150(7)  
|             |                         | Table 67.150  
|             |                         | 1.19 – 1.22  
| CASR 67.155 | For medical standard 2 | CASR 67.155(7)  
|             |                         | Table 67.155  
|             |                         | 2.18 – 2.21  
| CASR 67.160 | For medical standard 3 | CASR 67.160(7)  
|             |                         | Table 67.160  
|             |                         | 3.17 – 3.20  

2.7.3 Dipstick Testing

Haematuria

Urinary ‘dipstick’ testing is required as part of the routine aeromedical examination to screen for the presence of haematuria. Approximately 2-5% of the population have microscopic haematuria, but only about 0.5% who are under age 70 will have a urinary tract cancer as the cause. A positive dipstick test should be repeated, and if negative, managed expectantly. (Most of these applicants will have a minor glomerular lesion.)

Initial aeromedical management of an applicant with a persistently positive dipstick test involves obtaining phase contrast microscopy of a fresh mid-stream urine sample. The sample must be examined within two hours of being passed; thus individuals more than two hours from a suitable pathology service must travel to a location that has that capability. Because of wide variation between laboratories in reporting urine abnormalities, CASA’s relevant requirement for a ‘normal’ assessment in an applicant found to have microscopic haematuria is for three separate urine tests, all of which have less than 20,000 RBC per ml. Phase contrast microscopy of specimens with crenated cells up to 10,000 per ml, indicating a glomerular origin, are considered to be within normal limits. Cells with a ‘non-glomerular’ appearance are likely to indicate a urothelial problem.

Where there is ‘significant haematuria’ (more than 20,000 RBC per ml in any test), initial urogenital imaging is to be by Ultrasound or Intravenous Pyelogram (IVP), as some 10% of all stones are radiolucent. The requirement for further investigation should be determined on clinical grounds and on the basis of investigation results.
**Proteinuria**

Orthostatic proteinuria can be excluded by testing an early morning urine specimen. If an early morning specimen remains positive for protein, then a 24-hour urine protein estimation is required. Normal is <150mg protein/day.

**2.7.4 Urinary Calculi**

There have been no reported episodes of incapacitation involving CASA certificate holders with a known history of renal calculi. However, there have been several untoward incidents as a result of undiagnosed or unreported stone. The aviation environment may predispose aircrew to stone formation due to the low humidity environment often found in aircraft cockpits, and because of a tendency for some pilots deliberately to under-hydrate to avoid the need to urinate, particularly where there is no toilet on the aircraft.

The presence of any stone or stones in the urinary system is aeromedically significant. (For CASA certification purposes, there is no such entity as an asymptomatic stone). Renal stones as small as 1-2 mm diameter can and do cause significant symptoms. There are no reliable prognostic indicators that can determine if a stone will or will not cause symptoms, and the chance of a stone present for 10 years moving in the subsequent 24 hours is the same as it moving after being present for 10 days. The time a stone has been present is not a reliable indicator of risk.

**Single Renal Stone (Passed or Removed)**

In applicants who have had a single episode of renal colic, about 50% will have a repeat episode within 5-7 years, and nearly 100% within 12-15 years, unless they modify their behaviour. However, for applicants who have passed all stones or had them removed and who are able to maintain adequate urine flow (>2 litres/day), the risk of stone recurrence is the same as for the general population. Thus CASA will certificate pilots and ATCs who have experienced a single episode of renal stone disease, with successful removal or passage of the stone. In such cases, the only surveillance need be by urine dipstick at routine CASA medical examinations.

**Recurrent Renal Stones (Passed or Removed)**

Pilots and ATCs who have experienced recurrent episodes of renal stone disease may be recertificated once they are proven to be free of all stones in the kidney or renal tract, have normal renal function and have adopted appropriate risk minimisation behaviour. CASA will require the following annual investigations and reports in these cases:

- Plain abdominal X-ray or ultrasound
- 24-hour urine calcium and urate estimations
- Urological review.
2. Medical Aspects
2.7 Nephrology and Urology

Retained Renal Stones

Where stone material remains in the renal substance or urinary tract, CASA will not permit unrestricted Class 1 or Class 3 certification unless there are clear mitigating factors that preclude renal colic, such as a staghorn calculus, a calculus in a diverticulum, or a stone clearly embedded in the renal substance. (Further stone movement is extremely unlikely in such cases.) Pilots or ATCs with staghorn calculi many be suitable for certification, on a case-by-case basis, until stone removal, provided they are asymptomatic, their renal function is normal, and movement of the calculus is considered unlikely. CASA may entertain unrestricted certification for Class 2 applicants in similar circumstances, on a case-by-case basis, and subject to annual urological review.

Approximately 20% of patients will have residual calculi three months after undergoing Extracorporeal Shockwave Lithotripsy (ESWL). Where there is a small stone or remnant following attempted removal with ESWL, generally accepted management is to leave the stone alone. However, due to the risk of inflight incapacitation with residual stone fragment movement, it may be worthwhile to offer removal of stone remnants via flexible ureteroscopy. There is currently an approximate 50% success with this procedure, but its risks include urine extravasation, which can be extremely painful. Percutaneous nephrolithotomy (PCNL) may be a better option for pilots to ensure a stone free status.

2.7.5 Medullary Sponge Kidney

Persons with medullary sponge kidneys (MSK) tend to be chronic renal stone formers. Therefore, most applicants for pilot or ATC certification who have MSK will not be issued an aviation medical certificate of any kind. However, CASA may certificate pilots or ATCs with this condition, on a case-by-case basis, if they have a history of one episode of renal colic or fewer, and if there are no residual stones demonstrated on investigation. (Beware of the applicant with only a radiological diagnosis of MSK and no history of stones or calcification. Many such persons have only a prominent medullary blush with no adverse implications for aeromedical certification.)
2.7.6 Glomerulonephritis

**Thin Membrane Disease**

Thin membrane disease (TMB) is due to a type IV collagen genetic defect and occurs predominantly in females. It has no major health implications and is considered benign for the purpose of CASA aeromedical certification. Patients with TMB often have an incidental finding of 80,000-100,000 RBC per ml of urine, but further investigation reveals no other abnormalities. If blood pressure is normal and renal function tests are normal (including 24-hour urinary protein excretion and 24-hour creatinine clearance), CASA will accept a presumptive diagnosis of TMB and will not require further investigation. While biopsy may be offered to confirm the diagnosis of TMB, such an investigation is not required for aeromedical certification.

Where TMB is confirmed by biopsy, there is no requirement for any surveillance. In the case of a presumptive diagnosis, the result of a serum creatinine study is required with every subsequent CASA medical examination.

**IgA Nephropathy**

This condition was formerly considered to be benign, but it is now clear that it may later lead to renal failure in some persons. Risk of disease progression is greater when it is associated with hypertension, abnormal renal function test results and renal scarring, detected on biopsy. In the absence of such abnormalities, the risk of renal failure in cases of IgA nephropathy is about 1% after 20 years. The condition is of aeromedical concern because of the risk associated with subtle incapacitation due to circulating toxins produced as renal failure progresses. Rapid progression to nephrotic syndrome may also occur. CASA will usually certificate pilots and ATCs who are affected by IgA nephropathy. Required surveillance measures are:

- 24-hour urine protein estimations
- Serum albumin testing
- Renal function testing.

All of these tests are to be done at six-monthly intervals.
2.7.7 Nephrotic Syndrome

Many persons affected by this condition recover spontaneously, while others respond well to treatment with steroids. If immunosuppression is necessary for treatment, pilots and ATCs may not exercise the privileges of their licences until treatment is complete. CASA will consider recertification once the condition has resolved, medication has been ceased and renal function has returned to an acceptable level (defined as protein excretion <3g per day).

2.7.8 Renal Failure

For aeromedical certification purposes, renal failure is defined by biochemical markers of impaired renal function. Physical symptoms of renal failure occur late in this disease and represent manifestations of severe end stage renal failure.

The main marker of renal function is the serum creatinine level. Most persons with chronic renal impairment who have a creatinine level <200 micromol/L suffer no untoward effects. (However, DAMEs should recall that a creatinine level <200 micromol/L may evoke severe symptoms in cases of acute renal impairment). Where an applicant’s creatinine level is between 200 and 500 micromol/L, the DAME’s clinical acumen will be required to determine fitness for exercise of licence privileges. A creatinine above 500 micromol/L invariably produces untoward health effects, including:

- Slowed mentation
- Poor concentration
- Lethargy
- Gastrointestinal disturbance
- Other electrolyte disturbances
- Rapid deterioration with intercurrent illness.
Aeromedical Disposition

When there are three test results of >500 micromol/L creatinine, the DAME should advise the applicant not to exercise the privileges of his/her licence and inform CASA of the details. Following a single initial test result of >500 micromol/L creatinine, the certificate holder should be advised not to exercise privileges, and a further test arranged for 48 hours later. If the second test confirms the original result, a third test is required 48 hours later again. The DAME should inform CASA Aviation Medicine Section of the results, and CASA will usually suspend the applicant’s medical certificate. For reported creatinine levels between 200-500 micromol/L, the DAME will consider the possible effect on safe aviation of symptoms such as those listed above, and either advise the applicant accordingly or discuss the matter with CASA Aviation Medicine Section.

Acute renal impairment is usually associated with a significant insult which itself precludes a medical certificate holder from flying or controlling. Once recovered from the precipitating cause of acute renal failure, CASA will consider recertification on a case-by-case basis.

Renal Dialysis

Persons undergoing renal dialysis usually have significantly high creatinine levels, even soon after completing a dialysis session. Their electrolyte levels may be abnormal because of large fluid shifts that accompany dialysis. Consequently, persons undergoing renal dialysis may remain symptomatic for several hours following dialysis. CASA will not usually certificate pilots or ATCs with chronic renal failure who are undergoing dialysis (of any type). Very well controlled pilots and ATCs may be granted special certification, on a case-by-case basis, permitting exercise of privileges in the period between 12 and 36 hours (only) following a dialysis.

Renal Transplant

Following renal transplantation, most recipients receive immunosuppressants to prevent tissue rejection. They have increased risks of hypertension and of ischaemic heart disease, also of developing carcinoma. Some transplant recipients have minimal complications and normal renal function. CASA will not consider aeromedical certification for pilots or ATCs until 12 months following transplantation. If the applicant is then receiving standard immunosuppressant therapy, has well controlled blood pressure, and renal function is at an acceptable level, CASA, may consider recertification, on a case-by-case basis.
2.7.9 Single Kidney

If an applicant has a single kidney and this condition is developmental, renal function testing should be undertaken. If this is normal, aeromedical certification will be unaffected. If an applicant has a single kidney due to nephrectomy, the cause of the kidney’s removal must also be considered. If the underlying cause does not affect certification, then the same considerations of renal function testing and aeromedical disposition apply as for developmental variations.

2.7.10 Urinary Tract Infections

Female

In the young adult female, isolated urinary tract infection (UTI) is common. Investigation rarely reveals a specific cause. A small percentage of women will develop chronic or recurrent UTIs. They require investigation (including IVP) to exclude underlying anatomical causes. Some of them may need antibiotic cover for extended periods and/or post coital antibiotic prophylaxis. Female applicants receiving antibiotic treatment for recurrent UTIs are unlikely to adversely affect the safety of air navigation, and there need be no restrictions on their aeromedical certification.

Male

A UTI in a male usually indicates the presence of an anatomical abnormality in the urinary tract. The diagnostic yield from investigations is about 50%. Adequate investigation must include IVP and cystoscopy. Future aeromedical certification will depend on the findings from investigations.

2.7.11 Prostatitis

Acute bacterial prostatitis should be managed as an acute intercurrent illness (like UTI) and the pilot or ATC returned to duty only when fully recovered. Non-bacterial or chronic prostatitis is considered to be a form of pelvic pain syndrome, often accompanied by significant psychological overlay, analogous to the findings in Irritable Bowel Syndrome. Chronic prostatitis is often distracting and may be difficult to manage. Best pharmacological management is with anti-inflammatory and/or anti-depressant medications. CASA will determine future aeromedical certification of affected applicants on a case-by-case basis. The DAME should closely assess the psychological status of any affected pilot or ATC before making a recommendation concerning aeromedical disposition.
2.7.12 Urinary Outflow Obstruction

Benign prostatic hypertrophy (BPH) is the commonest cause of outflow obstruction in Australian males. Acute urine retention occurs in persons affected by BPH at the rate of 5-8% per annum. There is also a small risk of chronic incapacitation due to reduced renal function.

An acute retention episode may be treated by surgery, or by use of an alpha-blocker medication. Successful surgery will usually result in clearance to return to flying or controlling as soon as the applicant has fully recovered from the effects of the surgery. Note that alpha blockers may reduce G-tolerance—the more specific the drug, the better tolerated. Tamsulosin or alfalfusin are highly selective, but are seldom prescribed in Australia as they are not currently listed on the PBS. Prazosin is listed on the PBS, but is less selective than other available agents and has more side effects. Prazosin use is not compatible with agricultural or aerobatic flying, and medical certification for pilot applicants using it will contain appropriate restrictions.

2.7.13 Testicular Cancers

Also see Section 2.14, Malignancy.

Teratoma

The progress or recurrence of teratomas may be determined by use of an appropriate marker. Chemotherapy is the usual treatment and there is >90% cure rate. When the applicant has a stage A tumour and markers are normal, early return to duty may be possible. For stage B tumours, where adequate treatment requires 3-4 cycles of chemotherapy, return to duty will be delayed until at least three months after completion of chemotherapy. All such cases should be referred to CASA Aviation Medicine Section for determination of aeromedical disposition.

Seminoma

Seminomas are very sensitive to radiation, and a very low radiation dose may be curative. As there is no reliable marker available at present, surveillance can be difficult. Once treatment is complete, early return to duty may be possible. All such cases should be referred to CASA Aviation Medicine Section for determination of aeromedical disposition.
2.7.14 Prostatic Carcinoma

Prostate Specific Antigen (PSA) is a very reliable marker for progress of established prostatic cancer. However, it is unreliable as a screening test and there is still no normal range defined for it. Risk of prostate cancer against PSA may be graphed, and most laboratories recommend further investigation when a PSA is >4, but positive predictive value is poor at this level. Once PSA reaches 12, the PPV is close to 1.

In established disease, the PSA is a proxy measure of prostate bulk and of cell turnover. PSA levels >50 are associated with a significant risk of pathological fractures, cerebral and other metastases. However, applicants with prostate cancer and a PSA of <30 have a positive bone scan in <1% of cases. An applicant with PSA of <20 will have cancer mass of only a few grams, while a PSA <12 is not associated with significant risk of metastases.

Aeromedical Certification

Post-radical prostatectomy, if the operation has been successful, PSA should fall to undetectable level. If the level remains undetectable at three years post surgery, there is <5% chance of recurrence of disease. In such circumstances, applicants can be considered cured after four years. Radiotherapy now produces similar outcomes and if PSA remains at nadir levels for 3-4 years following radiotherapy, a similar assessment may be made. Usually, certification for all classes of medical certificate may be possible 3-4 months post surgery or after completion of radiotherapy. CASA will require annual follow up urological reports and PSA estimations. However, if the PSA remains undetectable five years after surgery, no further reports will be required.

Pilots and ATCs with advanced prostatic cancer and PSA >30 must also undergo bone scan as part of their required investigations. CASA will usually only contemplate certification for this group on the basis of ‘as-or-with co-pilot’ or ‘as-or-with second controller only’.

Treatment with anti-androgen therapy produces significant side effects in about 10-20% of cases, particularly lethargy. LHRH agonists may rarely cause a chronic confusional state. Prior to return to duties, an applicant receiving anti-androgen therapy will require an operational check. (Also see Section 2.13, Medication – Drugs and Flying / Controlling.)
2.7.15 Renal Cell Carcinoma

Cerebral spread from a renal cell carcinoma is highly likely. Previously, this cancer has usually been detected late, and affected persons have had poor survival rates. However, recently these tumours have often been detected incidentally by ultrasound. 80% of these tumours are now <5cm in diameter when found, and five-year survival in those affected persons is >90% following treatment. Even for larger tumours (<10cm), five-year survival is >70% following treatment.

**Aeromedical certification**

As the outcome of renal cancer is unpredictable, and as cerebral metastases are common, CASA will determine aeromedical disposition of pilots and ATCs with this condition on a case-by-case basis. If granted, initial certification is likely to be ‘as-or-with co-pilot’ or ‘as-or-with second controller only’. Certification will not be granted until at least six months following completion of treatment. Unrestricted class 1 certification will not be considered until at least three years post treatment. Class 2 applicants will be considered for unrestricted certification after two years, and Class 3 applicants after one year. CASA requires follow up investigations as follows:

- Six-monthly CT scans for Class 1 applicants
- Annual CT scans for class 2 and 3 applicants.

In all cases, additional investigations must include Full Blood Examination (to exclude polycythaemia), Liver Function Tests, and Urea and Electrolyte estimations.

After 10 years without recurrence of tumour following treatment, an applicant may be deemed ‘cured’. Thereafter, no additional surveillance measures will be required.
2.7.16 Polycystic Kidneys

Polycystic kidneys (PCK) may be associated with several complications that could adversely affect the safety of air navigation. These include acute pyelonephritis, haemorrhage into cysts, renal stones, berry aneurysms and cardiac valvular disease. However, most persons with polycystic kidneys do not experience these complications. The commonest side effect of the condition is hypertension, usually readily controlled by medication. Due to the statistical association of polycystic kidneys with berry aneurysm, all applicants with known PCK must provide the result of a recent Magnetic Resonance Angiogram (performed within 12 months). If this is normal, CASA will usually approve medical certification. However, the test must be repeated and results provided to CASA at intervals of five years while medical certification is maintained. If the DAME detects any cardiac murmur when examining an applicant with PCK, CASA requires an echocardiogram and report for initial certification. This is also the case when any new murmur is noted.

2.7.17 Amyloid

This is a systemic disease with possible renal, neuropathic and cardiological manifestations. On diagnosis of the condition, inform CASA Aviation Medicine Section and advise the applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA. Following appropriate investigations, CASA will determine aeromedical disposition on a case-by-case basis.
2.8.1 Gynaecological and Obstetric Standard – CASR Part 67

The gynaecological and obstetric standards are found in the following paragraphs of CASR Part 67:

- **CASR 67.150** For medical standard 1
  - CASR 67.150(7)
  - Table 67.150
  - 1.23 – 1.24

- **CASR 67.155** For medical standard 2
  - CASR 67.155(7)
  - Table 67.155
  - 2.22 – 2.23

- **CASR 67.160** For medical standard 3
  - CASR 67.160(7)
  - Table 67.160
  - 3.21 – 3.22

2.8.2 Severe Menstrual Disturbances

Applicants with a history of severe menstrual disturbances resistant to treatment must be assessed with caution. Such applicants are likely to be unacceptable for issue of a Class 1 or Class 3 Medical Certificate.

2.8.3 Pregnancy

Pregnancy, particularly during the final trimester, is a cause of temporary unfitness to exercise the privileges of all aviation licences. However, where the obstetrician or other medical practitioner supervising the pregnancy certifies that an applicant or medical certificate holder has no significant medical contraindications related to the pregnancy, she may be assessed as meeting the appropriate medical standard(s). The exercise of licence privileges in such circumstances may involve imposition of appropriate, individually determined operational restrictions.

The risk of acute incapacitation from premature labour exceeds 1% after 30 weeks gestation. Consequently, all medical certificate holders are advised not to exercise licence privileges after 30 weeks gestation.

Class 1 and 2 medical certificate holders are formally deemed medically unfit to exercise licence privileges from 30 weeks gestation until cleared by a post-partum assessment conducted in accordance with the last paragraph in this section.
Class 3 medical certificate holders may exercise relevant licence privileges until 34 weeks gestation provided that:

i. The obstetrician or other medical practitioner supervising the pregnancy certifies that the licence holder is fit for duties during this period; and

ii. Suitable administrative arrangements are made which ensure that sudden incapacitation of an affected licence holder due to premature labour will not adversely affect the safety of air navigation.

Thereafter, Class 3 medical certificate holders also are formally deemed medically unfit to exercise licence privileges until cleared by a post-partum assessment conducted in accordance with the following paragraph.

Following delivery, applicants are required to obtain a clearance from a DAME before once again exercising the privileges of an aviation licence. Depending on the stage of a pregnancy at which the event occurs, such clearance may also be required following a miscarriage, stillbirth or termination of pregnancy. Pregnancy is considered a medically significant condition and DAMEs should remind pregnant applicants of their obligations under CASRs to refrain from exercising their licence privileges until medically cleared. (See also 1.4.5 Temporary Incapacity of Certificate Holders.) Following a normal delivery, clearance to resume flying duties should be appropriate at six weeks post-partum.
2.9 Introduction

There is a very wide range of conditions of the gastrointestinal tract and associated organs that may have aviation safety implications. The greater majority are compatible with certification after appropriate assessment and management. This section provides guidance on common conditions of the gastrointestinal tract, liver and pancreas that may be presented to a DAME. It does not cover GI malignancy. All malignancy related advice is addressed in the Section 2.14 Malignancy of this handbook.

2.9.2 Alimentary System Standard – CASR Part 67

The alimentary system standards are found in the following paragraphs of CASR Part 67:

- CASR 67.150 For medical standard 1 CASR 67.150(7), Table 67.150 1.14
- CASR 67.155 For medical standard 2 CASR 67.155(7), Table 67.155 2.13
- CASR 67.160 For medical standard 3 CASR 67.160(7), Table 67.160 3.13

2.9.3 Gastro-Oesophageal Reflux Disease (GORD)

GORD is a very common condition. GORD and Irritable Bowel Syndrome are the two most common GI diagnoses in the Australian pilot population. Underlying pathology that is severe or progressive is unlikely. However, the possibility of cardiological cause of the symptoms should always be borne in mind, particularly where there is resistance to treatment. Where there is chest pain with uncertain aetiology, it is imperative to exclude a cardiac cause before moving to GI or other systems.

Around 50% of all patients diagnosed with GORD have no findings on endoscopy. This is often described as nervous or non-ulcer dyspepsia (NUD) but in reality this is endoscopy negative symptomatic gastro-oesophageal reflux that might be revealed by other techniques, such as oesophageal pH monitoring. NUD refers to symptoms that occur in a group of people without endoscopic or physiological evidence of an acid-peptic complaint. These people usually have a limited or zero response to acid suppressing medication.
Treatment can commence based on symptoms and endoscopy conducted, when response to treatment is poor, “alarm” symptoms occur (eg bleeding, dysphagia) or long term treatment appears to be indicated. Medication is generally very successful, especially with the development of Acid/Proton Pump Inhibitors (PPIs). These drugs have a low side effect profile. Bleeding from reflux oesophagitis while on PPIs is very rare. In theory, intense gastric acid suppression by PPIs may increase susceptibility to gastrointestinal infection, as the internal environment of the stomach is less hostile to ingested organisms. Those who have been treated and are symptom free are generally suitable for certification. Where there are persisting symptoms, treatment should continue, with regular reviews. High-risk ‘alarm’ symptoms such as dysphagia indicate endoscopy. After short term treatment symptoms may return, sometimes with a rebound effect after stopping a PPI. Ongoing treatment may be indicated. However, ‘on demand’ treatment is becoming more popular. This should not present difficulties with aviation duties.

Selective Serotonin Reuptake Inhibitors (SSRIs) are fairly commonly prescribed along with PPIs for non-ulcer dyspepsia. This is not a risk in itself, but caution is required with the use of SSRIs. Refer to the Section 2.6 Psychiatry in this handbook. Cisapride and SSRIs have a risk of cardiac arrhythmia. Treatment with cisapride is mostly limited to treatment of gastroparesis and therefore cisapride is likely to be withdrawn from the Australian market.

Other medications that may be used include H₂ receptor antagonists. There is some sedation associated with these medications, and a ground trial period is advised. Metaclopramide may on occasions alter the level of consciousness and should not be used for ongoing treatment.

Barrett’s Oesophagus

- **Long Segment**: Second-yearly endoscopy will generally be required.
- **Short Segment**: Five-yearly endoscopy will generally be required but current approaches vary.

### 2.9.4 Peptic Ulcer Disease

Management of peptic ulcer disease (PUD) has changed comprehensively following the identification of helicobacter pylori as the most common cause of ulcers. The vast majority of peptic ulcer disease is now known to be due to helicobacter or NSAIDs. Smoking is a further independent risk factor. PUD may be ‘silent’ and not cause symptoms but the risk of a sudden acute bleed in an asymptomatic person is small. “Silent” ulcers are more common and more likely to cause morbidity in those taking NSAIDs including COX-2 inhibitors.
Duodenal PUD

Symptomatic PUD with helicobacter pylori. With the onset of symptoms, the DAME should impose a period of no flying or controlling. In this case, there is a requirement to undertake clearance of the infection prior to return to flying. A negative urea breath test is usually taken to be definitive proof of clearance when performed around two months after treatment. Where the DAME is satisfied that that symptoms have resolved and there will be compliance with the rest of the treatment, there may be a return to flying or controlling. Such return must be on the understanding that evidence of clearance of infection is required within three months of completing treatment. Definitive proof of clearance is usually currently obtained by a urea breath test around two months after treatment. A period of at least seven days off PPIs is necessary prior to the test. Should the infection still be present, the risk of recurrence of symptoms is high (around 80% in the first year). Failed eradication usually indicates the need for further treatment. Without eradication after the follow up test, further treatment is required. Where this second attempt at clearance is unsuccessful, the pilot or controller will usually be grounded until eradication is proven. Where there is symptomatic duodenal PUD only without complication, there is no requirement for a second endoscopy to prove ulcer healing. Once eradication has occurred, the lifetime risk of recurrence is only around 3 to 5%.

Symptomatic PUD without helicobacter pylori. The cause of the PUD needs to be identified and corrected. This is most commonly NSAIDs. The usual treatment for the ulcer in this case is a PPI for around six to eight weeks.

Complicated duodenal PUD. Where there are complications of PUD such as bleeding or perforation the pilot should be grounded during treatment. Endoscopic proof of ulcer healing will usually be required prior to clearance to return to flying or controlling. Approximately 80% of all ulcers are healed after one month. Therefore, the second endoscopy is best scheduled for around this time. Furthermore, when helicobacter infection has been detected and treated, proof of clearance will be required either by a urea breath test or endoscopic gastric biopsies for rapid urea testing (eg CLO/HUT tests) or histology.

Chronic duodenal ulcer without eradication of Helicobacter pylori. Consideration will be given to certification of pilots or controllers who have not eradicated Helicobacter pylori, either due to not undertaking eradication or failure of the eradication. Applicants must be on long-term maintenance therapy with a proton pump inhibitor and without symptoms.

Gastric Ulcer

Gastric ulcers should be treated in a similar way to complicated duodenal ulcers. A second endoscopy, usually at one month after beginning treatment, is required to demonstrate healing of the ulcer prior to consideration of return to flying. The underlying cause of the ulceration needs to be identified and corrected wherever possible.
2.9.5 Hepatitis

**Acute**

Acute hepatitis may be due to a number of causes, predominantly infectious but may also be toxic or immunological. The individual is usually too sick to function adequately and is not physically able to fly. The enterically mediated causes, mainly Hepatitis A and E, and other causes such as CMV and EBV generally result in a full recovery. Initial work up should include routine blood tests, LFTs, FBE, infectious hepatitis serology, and an upper abdominal ultrasound. Return to flying is based on evidence of clinical recovery. Some episodes of hepatitis are followed by a prolonged phase when the patient remains jaundiced but otherwise recovers. No further investigation is recommended until six months after presentation, unless the episode is fulminant. In this case, patients may progress from walking to moribund in 24 to 48 hours, but thankfully this extremely fulminant presentation is rare.

**Chronic**

The main causes of chronic hepatitis of aeromedical concern are Hepatitis B and Hepatitis C. These may be slowly progressive and may lead to cirrhosis and hepatic decompensation. There is unlikely to be an acute presentation, unless unexpected decompensation occurs secondary to portal hypertension causing haematemesis or ascites with infection.

Transmission of infection is not an issue in civilian aviation. The presence of Hepatitis D in particular should raise the prospect of intravenous drug use.

**Treatment for Hepatitis C.** Current treatment protocol for progressive Hepatitis C infection is combined Interferon and Ribavirin. Both of these medications have significant aeromedical issues, with interferon occasionally causing neuropsychiatric symptoms, which may occur intermittently and unpredictably throughout treatment. Most people also experience significant malaise. Ribavirin produces a significant anaemia in many patients. Thus, there should be no flying or controlling during the course of treatment. There may be consideration of return to duties once off medication and any anaemia has resolved.

**Progressive hepatitis** There is no one measure of the progression of chronic hepatitis and cirrhosis. Bilirubin, albumin and prothrombin time/INR are the best independent laboratory measures. These should be considered together with the presence of ascites and encephalopathy. Each case needs to be individually assessed, particularly for the presence of portal hypertension and hepatic encephalopathy, including minimal (stage 1) hepatic encephalopathy (MHE). While there is no overt deterioration in cognitive or affective functioning, there will not be a restriction on flying, but increased surveillance will be necessary.

Abnormal LFTs that have been noted for greater than 12 months indicates the potential for chronic liver disease and cirrhosis.
Liver biopsy. A liver biopsy provides very useful diagnostic and prognostic information but can cause serious complications such as intra-abdominal haemorrhage. The decision to recommend biopsy will usually be delayed for at least six months after presentation depending on the degree to which liver enzymes and function are abnormal. Many patients with abnormal liver enzymes, even over a long period, will not have an absolute indication for liver biopsy. The timing of liver biopsy, if necessary, can be based on clinical progression and the level of concern expressed by the patient regarding diagnosis and prognosis.

2.9.6 Abnormal Liver Function Tests

Liver function tests are frequently found to be abnormal, with small elevations in one or two liver enzyme parameters. Given that the normal range by definition comprises two standard deviations from the mean, some 5% of all truly normal results will be classified as being abnormal—that is, falsely abnormal results. Where there is a real abnormality, the most common causes are Gilbert’s Syndrome (slightly raised unconjugated bilirubin, most common manifestation), non-alcoholic fatty liver disease (NAFLD), and minor alcohol effects.

In the absence of other clinical clues, slightly abnormal LFTs are best repeated after around one month. If they remain elevated, then the following is recommended:

1. Assessment of alcohol intake.
2. Family history of liver disease.
3. Blood Tests: Hepatitis B & C; Iron studies including ferritin; Copper studies; $\alpha_1$ antitrypsin; hepatic autoantibodies.
4. Upper abdominal ultrasound.

Definitive diagnosis of a fatty liver can only be achieved by liver biopsy, but it is usually diagnosed based on clinical picture only. Alcoholic disease and diabetes mellitus should be included in the differential diagnosis. Ultrasound is moderately reliable for fatty liver, with increased echogenicity/altered hepatic texture most likely to be due to fat. However, fibrosis or cirrhosis could also be present and difficult to detect.

There should be regular reviews of aircrew with continuing abnormal LFTs. Where transaminase is <100, repeat testing should be every six to 12 months. If the transaminase is above 100, testing should be every three to six months.
2.9.7 Alcoholic Liver Disease

This section will not discuss alcohol related illness. Rather, there will be a discussion of the effects of alcohol on the GI system.

There are no definitive tests that can demonstrate clearly that alcohol is the cause of liver disease. In the end it comes down to honest reporting. Blood tests can help; MCV, γGT and AST>ALT are suggestive. Liver biopsy is not definitive as many other causes can produce similar findings. Carbohydrate deficient transferrin is becoming used, but it remains largely a research tool. It can be useful as a confirmation, and to monitor progress within that individual.

Relapsing hepatic decompensation, gastritis, neurological signs, including cerebellar signs are all useful as part of a broader picture in advanced cases of alcoholic liver disease when cognitive and physical incapacity are present. DUI convictions may also be indicative.

Screening tests have not been found to be particularly valuable. The AUDIT is probably the most widely used. The tests are aimed at the severe end of the alcoholic spectrum. In practice, concern should be raised where the drinking exceeds the NH&MRC recommended limits of four standards drinks per day for men and two standard drinks per day for women.

Approximately 1:5 people who drink excessively will have liver abnormalities. It is the most reversible form of liver disease in the early stages. Stopping drinking will usually reverse abnormalities within around six months. The alcoholism is more important than the alcoholic liver disease, and the focus should be put on the alcoholism. Until there is a secondary effect from liver damage, there should be no impact on flying from the liver disease. The impact on flying will be from the alcoholism.

2.9.8 Gallstones And Gall Bladder Diseases

Asymptomatic gallstones (chance finding). It appears that the risk of cholecystitis in the presence of asymptomatic gallstones, where there has never been symptoms, is low, and almost certainly is below 1% per annum, although there is little data to work from. Gallstones ranging from a single large stone to multiple small stones may be detected by ultrasound. There is a slightly increased risk of biliary colic, pancreatitis and other hepatobiliary symptoms with small gallstones but the outcome of expectant versus prophylactic cholecystectomy is no different. There will generally be no change to flying status unless gallstones become symptomatic. In those who are asymptomatic there is no requirement to remove the gall bladder for fitness to fly.

Acute cholecystitis. Generally the pilot will be too sick to fly.
Following single episode of cholecystitis. Often after a single episode, patients are treated expectantly and wait to see if another episode occurs. However, the risk of a further episode is around 5% per annum. Therefore, it would be expected that there is no return to flying until the gall bladder is removed. There may be the option of multi-crew certification for Class 1 or 2, or no solo controlling for Class 3 pending definitive resolution.

Stones in bile duct. The presence of stones in the bile duct is not compatible with flying or controlling. There is a significant risk of ascending cholangitis or pancreatitis, and the stones must thus be removed prior to returning to any duties.

2.9.9 Haemochromatosis

Haemochromatosis is a genetic disease that is often found incidentally, mainly through liver function testing or iron studies. The presence of the relevant genes in the Australian population is around 1:200. Around 50% of these will develop significant iron loading but not all genetically affected individuals develop liver or other organ injury (ie, phenotypic variation in disease expression). Organ injury depends on the severity of iron loading and co-factors such as significant alcohol consumption or other co-existent causes of liver injury. Should iron loading be prevented (usually by early detection and venesection treatment) then permanent liver injury (fibrosis/cirrhosis) usually does not occur. The best measure of iron stores in this context is serum ferritin.

Screening is possible, but to date has not been recommended in the Australian population. This may be by transferrin saturation, or by HFE genetic testing. There is no requirement to screen for haemochromatosis in the aviation context unless there is a family history of the disease.

Late diagnosis can be a problem, with progression to cirrhosis, pancreatic injury (diabetes mellitus), heart (arrhythmias, heart failure) and pituitary involvement. Males usually present in the 5th decade, females in the 6th decade due to their generally lower rate of iron load. If, at age 40 years the ferritin level is less than 1000 ug/ml and LFTs are normal, the risk of permanent liver damage is negligible. Cardiac assessment should include the presence of conduction defects and cardiomyopathy.

Treatment is via regular phlebotomies/venesection. Pilots and controllers should not exercise the privileges of their certificates for 24 hours after each venesection due to possible cardiovascular instability.
2.9.10 Pancreatitis

Pancreatitis is sometimes diagnosed in the setting of a small increase in serum lipase. However, for the diagnosis to be made there should be a significant increase in lipase together with acute abdominal pain.

The main risk factors are

- **Gall stones.** If gallstones are found, where there are no other risk factors, the gall bladder should be removed.
- **Alcohol.** This usually produces a relapsing picture.
- Hypercalcaemia.
- Hyperlipidaemia.

Where there is no obvious cause, there may be abnormalities in anatomy. Assessment is usually by MRCP first, followed by ERCP.

Risk of recurrent attacks is highly individual. Idiopathic pancreatitis may be expected to have one to two attacks per year.

**Single episode.** Following a single episode, where there are no ongoing symptoms and any predisposing factors have been addressed, the individual will usually be able to return to flying.

**Recurring pancreatitis.** While symptomatic the individual is very unwell, usually requiring narcotic analgesia. Recurrent pancreatitis is generally not compatible with continued flying or controlling.

**Chronic pancreatitis.** Generally the individual is too sick or has too much ongoing abdominal pain to contemplate flying. A CT scan can be performed to look for the presence of a pseudocyst or abscess. It is unlikely that anyone suffering from chronic pancreatitis will be fit for flying or controlling duties.

There is an association with the development of diabetes; a fasting blood sugar should be obtained as part of the workup.
2.9.11 Coeliac Disease

Coeliac disease can produce severe symptoms of bloating, diarrhoea, abdominal pain and anaemia, but mostly symptoms are mild and presentation is now usually in mid-life. Treatment with a gluten-free diet is usually effective, and should not be an aviation safety issue. People non-compliant with dietary modifications will continue to be symptomatic and some patients will exhibit refractory disease; these cases should be considered on their merits.

Coeliac disease should be thought of as a potential marker for other immunologically mediated diseases, such as type 1 diabetes mellitus and thyroid disease.

2.9.12 Irritable Bowel Syndrome

Irritable bowel syndrome is a very common diagnosis in the Australian pilot population. Some 20% of adult females and 10% of adult males have some symptoms consistent with this diagnosis. Most common symptoms are of abdominal pain, bloating, diarrhoea and constipation. It is unusual to get acute, severe symptoms.

There is a high co-morbidity with obsessive and depressive illness and SSRIs are often used.

Most people can be managed without drugs, using diet.

Diarrhoeal symptoms may be treated with loperamide. This drug does not usually have any central nervous system side effects. Diphenoxylate should not be the first drug of choice for aircrew or controllers, due to its potential neuropsychological effects. If it is necessary, this should be discussed with Aviation Medicine Section doctors.

Colicky abdominal pain and more general abdominal discomfort can be treated with anticholinergics such as donnatabs or mebeverine. Bloating will tend to persist despite treatment. Caution is required regarding anticholinergic side effects, particularly to vision.

Constipation can be treated with high fibre and simple laxatives, with osmotic laxatives such as magnesium sulphate or lactulose preferred in the longer term.

For refractory symptoms, tricyclic antidepressants are the most effective. Tricyclic antidepressants have significant potential aeromedically adverse effects. Refer to Section 2.6 Psychiatry for further guidance.

Most applicants will be fit to hold a certificate. Surveillance may be required annually in the more severe cases.
2.9.13 **Inflammatory Bowel Disease**

It is often assumed that Ulcerative Colitis and Crohn’s disease are versions of the same disease or are even interchangeable. However, they do have differing natural histories, with Crohn’s disease tending to be worse, with relapse being the rule.

It should be assumed from the outset that Inflammatory Bowel Disease (IBD) will impinge on certification. However, most sufferers are able to obtain certification with regular surveillance.

High-dose systemic steroids should not be used while flying due to the risk of neuropsychological side effects.

If the disease is unstable the person should be grounded, due to diarrhoea, pain and poor nutrition. Stabilisation is usually over several months during treatment with aminosalicylate drugs (e.g., sulphasalazine, mesalazine, olsalazine) and either systemic or rectal corticosteroid treatment. Immunomodulatory medication (such as azathioprine or 6-mercaptopurine) is used to prevent disease relapse in more severe cases. There is a higher risk of skin cancer on azathioprine. Methotrexate can damage the liver.

Flare-ups tend to occur in a subacute manner, with warning often over several days. Acute incapacitation is unlikely, unless there is a clear pattern of such already established. Fitness to fly during flare-ups should be handled as a transient event with clearance to return to flight duties according to CASR 67.265.

**Ulcerative Colitis**

Ulcerative Colitis may be severe, but is often a relatively mild disease. This is especially so of treated ulcerative colitis of the rectum and sigmoid. The disease may ‘burn out’ in the 50s. With proctitis alone, risk of cancer is no different to the general population.

**Crohn’s Disease**

Almost all Crohn’s sufferers receive surgery at some stage. Systemic symptoms are more common with febrile disease and acute abdomen amongst the more common manifestations.

For mild disease, Full Blood Examination, C-reactive Protein, Liver function tests and rectosigmoid examination should be carried out annually. LFT should be more often if taking methotrexate.

When there has been pancolitis, regular annual or biennial colonoscopy will improve early detection of colorectal neoplasia beginning eight to ten years after initial diagnosis of colitis.
2.9.14 Chronic Diarrhoea

There are many potential causes of chronic diarrhoea. Most commonly there is irritable bowel syndrome. However, it is important to rule out an infective cause. Medications may also be a cause, such as weight loss treatments including xenical.

In general, diagnosis should be by exclusion of treatable GI disorders, and then treated as for IBS.

2.9.15 Diverticulitis

Diverticulosis of itself is not an issue for aviation safety. A single episode of diverticulitis is generally not of significant concern. Where there is chronic symptoms or recurrence, it is important to evaluate for risk of further symptoms. Partial colonic resection may be required. Each case will be considered on its merits.

2.9.16 Colonic Polypectomy

Following polypectomy by colonoscopy, there is an approximate risk of 1:300 to 1:500 that a significant colonic bleed from the polypectomy site will occur in the first two weeks. The risk is higher if anti-platelet drugs or anti-coagulants are taken after colonoscopy. During this time, therefore, it is best not to fly, due to the risk to safety and lack of access to care. However, it may be reasonable to consider flying operations other than single pilot operations or no solitary controlling.

2.9.17 Bowel Obstruction

Bowel obstruction will result in severe pain and vomiting. A history of bowel obstruction indicates a high risk of recurrence. A single band or hernia can be repaired and certification is usual after recovery. However, recurrent obstruction is of grave concern for certification. Generally, the more episodes of obstruction, the greater the risk of subsequent episodes. Certification will be on a case-by-case basis, with a surgical opinion as to the cause and likelihood of recurrence.
2.9.18 Stomas

In this section the underlying illness or event leading to creation of an “-ostomy” is not addressed. Stoma bags are generally vented and filtered to avoid any risk of trapping of gas or odours becoming an issue.

**Colostomy**

Generally, patients with a colostomy manage well. Most are due to surgery for colon cancer, and the oncology issues are more important. See section 2.14 Malignancy of this handbook. A total colectomy for functional problems often results in small bowel functional problems.

**Ileostomy**

The major issue with ileostomy is dehydration. Electrolyte disorders are fairly common, with hyponatraemia and bicarbonate loss. Fluid that is usually reabsorbed will be lost through the stoma, and an additional litre of fluid may be required.

The great majority of applicants with a stoma will not be restricted on the basis of the stoma.

2.9.19 Haemorrhoids

Haemorrhoids will occur with a relatively high frequency in the pilot population, due to poor low fibre diet, inadequate seating and dehydration. It is rarely a cause of acute incapacitation.

Rectal bleeding should be investigated to exclude other causes, especially carcinoma, even in the presence of haemorrhoids. Only with the exclusion of other causes should the haemorrhoids be regarded as the cause.

An acute clot in an external haemorrhoid often causes marked discomfort, but should not be sufficient to cause incapacitation.

The presence of haemorrhoids should not in general hold up certification.

2.9.20 Anal Fissure

As for haemorrhoids, the presence of bleeding should result in investigation to exclude other more serious causes. The fissure may be distracting but not to the extent of incapacitation.
2.9.21 Abdominal Hernias

Abdominal hernias are of concern due to the risk of acute intestinal obstruction. Where the hernia is amenable to repair and there is a risk of obstruction, it should be treated. If no treatment is planned, a justification based on likelihood of becoming symptomatic should accompany any application. While waiting for repair, the need to restrict the applicant will depend on clinical circumstances. Where there is a bowel loop in a hernia, restriction is likely.

Hiatus hernias only infrequently require repair. A rolling hiatus hernia is at greater risk of obstruction. Generally symptoms can be managed through the use of proton pump inhibitors or H₂ antagonists.

2.9.22 GI Bleeding of Unknown Cause

Where there is an iron deficiency anaemia that has been investigated, and endoscopy and colonoscopy are reported as normal, the source of bleeding is likely to be from the small bowel. Often iron deficiency occurs in those who have had long-term aspirin or NSAID treatment. At present, in the absence of ‘red flags’ (eg, systemic symptoms such as unexplained weight loss, fevers, night sweats, persistent significant change in bowel habit, abdominal pain or symptoms of overt GI bleeding such as malaena) to suggest a serious cause, the patient will not be further investigated, and iron supplements used. If supplements are successful, then a cause will probably never be found.

Where iron supplements are used and anaemia progresses, further investigation is required; this may be enteroscopy using a similar procedure to endoscopy, ‘capsule endoscopy’ and/or CT scan. A thorough work up is mandatory to exclude significant disease.

It should not be necessary to ground pilots except those whose anaemia progresses and haemoglobin drops below 10.

If the Hb recovers, then surveillance should be of regular Hb levels, at least every two months for 6-monthly and subsequent testing depending on progress. Restoration of body iron stores (as documented by a progressively normalising serum ferritin taken during a period when iron supplements have been stopped for at least one week) by treatment with oral iron supplements usually takes three to six months minimum, usually with the Hb having returned to normal at an earlier time.

A presentation of malaena is a very different proposition. A cause will need to be identified as there is a high risk of recurrence and of severe causes. The individual should not fly until the cause has been identified and risk of recurrence quantified.
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2.10.1 Introduction

Applicants with haematological conditions are considered individually depending on the nature of the condition, its cause (if known) and natural history. The overriding concern is that the blood must carry sufficient oxygen to satisfy metabolic requirements during all phases if flight.

2.10.2 Reticulo-endothelial System Standard – CASR Part 067

CASR 67 The Reticulo-endothelial System standards are found in the following paragraphs of CASR Part 67:

- CASR 67.150 For medical standard 1 CASR 67.150(7) Table 67.150 1.17 – 1.18
- CASR 67.155 For medical standard 2 CASR 67.155(7) Table 67.155 2.16 – 2.17
- CASR 67.160 For medical standard 3 CASR 67.160(7) Table 67.160 3.16

2.10.3 Anaemia

Applicants whose haemoglobin is less than 100 g/l should be investigated as clinically indicated. Final assessment depends on the results of haematological investigations and response to treatment. Full reports are required.

2.10.4 Polycythaemia

Applicants with higher than normal haemoglobin must be appropriately investigated. In secondary polycythaemia due to lung disease, the lung disease is more important. Applicants with polycythaemia vera, untreated or uncontrolled, will be assessed as failing to meet the standard, but will be reconsidered depending on their response to treatment, and on specialists’ reports.
2.10.5 Acute Leukaemia

Acute leukaemia of any type is disqualifying. Applicants assessed as in remission may be permitted to exercise the privileges of the licence held, depending on specialists’ reports. Full details are required.

2.10.6 Chronic Leukaemia

Chronic leukaemias are assessed individually. A specialist’s report is required in every case, including a statement on prognosis for the next year (re-certification is year by year, if at all). Some chronic leukaemias, e.g. CGL, CLL and other myeloproliferative diseases, are usually associated with an enlarged spleen. There is a consequent risk of splenic infarction and rupture (spontaneous or traumatic) in these applicants.

2.10.7 Lymphomas

Applicants with lymphoma are assessed individually. A lymphoma in remission, especially Hodgkin’s Disease, is usually consistent with a pass assessment for applicants concerned. Annual specialist reports are required in all cases.

2.10.8 Haemoglobinopathy

Applicants with abnormal haemoglobins (HbS) are assessed individually. Full reports to Aviation Medicine Section are required.

2.10.9 Haemophilia

Applicants may be certified at the Class 2 level if the condition is stable. Full reports from the treating physician are required.
2.10.10 Oncology

Assessment of applicants with any diagnosis of malignancy is based upon the following considerations:

- Nature of tumour
- Stage of development/invasion
- Response to therapy
- Likelihood of recurrence in a form likely to be incapacitating, e.g. cerebral metastasis.

In general, applicants who are no longer receiving chemotherapy or radiotherapy, in whom the risk of incapacitation is considered to be low during the period of currency of the Medical Certificate, are given a pass assessment subject to continued medical surveillance.

Also see Section 2.14 Malignancy.

2.10.11 HIV Disease

Applicants who are HIV positive but without clinical disease may be certified at the Class 2 level and receive restricted certification (as or with co-pilot) at the Class 1 level.

Applicants should obtain reports (including CD4 helper cell count) from their treating physicians prior to seeking renewal.

When an applicant develops clinical illness associated with HIV disease, further certification is determined on a case-by-case basis. Full clinical details are required.

2.10.12 Blood Donation

In healthy individuals, the fluid depletion that accompanies donation of one unit of blood is replaced within several hours. Any effects from the loss of haemoglobin should not be significant for normal flying operations.

Active pilots should be discouraged from flying until 24 hours have elapsed following blood donation.
2. Medical Aspects
2.10 Haematology and Reticulo-endothelial Conditions

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2.11.1 Introduction

When an applicant has a non-trivial orthopaedic or arthritic disability such as loss or partial loss of a limb, joints with a limited range of movement, or significant muscular weakness, the following information is required:

- A detailed description of the condition and any associated clinical problems
- An indication of whether the condition is progressive, static or likely to improve
- The nature and degree of any movement limitation
- The extent of any associated loss of power or co-ordination
- An indication of how the limitation is likely to affect the applicant’s ability to control an aircraft.

It may be necessary for an applicant with such a condition to undergo a practical (cockpit) check in the aircraft type he or she wishes to fly. Generally, if an applicant can demonstrate the ability to carry out all required normal and emergency actions, with a prosthesis if necessary, certification is possible. Appropriate restrictions may be placed on the licence (eg, not to fly aircraft with toe-operated brakes, not to fly multi-engine aircraft, etc).

In applicants with arthritic conditions, the nature and dose of medication required to control the arthritis is an important consideration. In those arthritides associated with systemic disease (eg, rheumatoid arthritis), signs of systemic involvement should be sought and recorded. Each case is assessed individually and full clinical details are required.

2.11.2 Skeletal System Standard – CASR Part 67

The skeletal system standards are found in the following paragraphs of CASR Part 67:

CASR 67.150 For medical standard 1 CASR 67.150(7) Table 67.150 1.25 – 1.26

CASR 67.155 For medical standard 2 CASR 67.155(7) Table 67.155 2.25 – 2.25

CASR 67.160 For medical standard 3 CASR 67.160(7) Table 67.160 3.23 – 3.24
2.11.3 Paraplegia

A number of applicants with paraplegia have been licensed at the private pilot level after passing a cockpit check. The applicant's condition must be stable for this to be possible. Full details of medications taken should be recorded, as these may include diazepam and/or baclofen for control of muscle spasm, and alpha agonists or tricyclics to aid sphincter control. Full reports are required.

The pilot has a responsibility to help evacuate passengers in the event of a crash or emergency landing. Four per cent of light aircraft accidents are followed by fire, so an ability to leave the aircraft is essential. Applicants with paraplegia must be aware of the added risk to themselves and their passengers. For this reason, such applicants who apply for a professional pilot Medical Certificate are usually assessed as "fail".

Applicants with paraplegia who apply for an ATC licence are assessed individually.
2.12.1 Ear, Nose and Throat Standard – CASR Part 67

CASR 67.150 For medical standard 1

CASR 67.155 For medical standard 2

CASR 67.160 For medical standard 3

2.12.2 Hearing Requirements Standard – CASR Part 67

CASR 67.150 For medical standard 1

CASR 67.155 For medical standard 2

CASR 67.160 For medical standard 3

2.12.3 Examination of the Ear

There should be no signs of active disease of the middle ear cavity. Applicants should be able to ventilate the middle ear.

Perforations of the tympanic membrane are acceptable, however the cause of the condition should be sought and investigations initiated, if appropriate.
2.12.4 Hearing

An applicant for a Class 2 Certificate must be able to hear an average conversational voice at two metres with the back to the examiner. Accordingly, applicants who are deaf in one ear may pass.

More rigid standards apply to professional licence holders. Audiograms are required for initial Class 1 and 3 and at defined intervals thereafter.

If any doubt arises as to the acceptability of an applicant's hearing, an audiogram should be obtained and, if appropriate, specialist consultation recommended. The audiogram printout should be enclosed with the medical report for initial issue Class 1 and 3 examinations.

Audiograms are acceptable from facilities other than Australian Hearing Services (AHS) facilities. Applicants who are found for the first time to be within 10dB of the limits stated in the schedule should be retested by AHS. Where the deficit is long-standing and has been previously recorded, a non-AHS audiogram will be acceptable provided it demonstrates no significant deterioration.

Where a supplementary speech test is required, this can only be performed by AHS as the calibrated tapes and other equipment required are not available elsewhere. If the applicant fails the speech-based hearing test, in some cases an in-flight test may be offered if he/she has a high level of aeronautical experience. Such an operational check will involve evaluation of relevant aspects of the applicant’s hearing by a CASA Flying Operations Inspector or an Authorised Testing Officer with test material transmitted from a control tower. Ideally the test should be conducted in the class of aircraft, which is the same as that which the applicant normally operates or intends to operate.

Applicants for Class 2 Certificates may wear hearing aids during testing. Any applicant who meets the hearing standard in this way is required to wear the aid during all communications on the ground that relate to the conduct of a flight. Adequate amplification during flight may be achieved by the use of headphones. Headphones with ear cups have the added advantage of blocking out aircraft noise. All pilots should be encouraged to fly with headphones, in the interests of improving hearing and for hearing conservation.

2.12.5 Vestibular Function

Any history of vertigo or dizziness should be fully investigated and the presence of nystagmus noted. If there is concern about vestibular function, referral for caloric testing and electronystagmography should be considered.
2.12.6 Speech

Any significant speech impediment or stuttering should be reported, and full details are required. As a minimum, reports from an ENT specialist and from a speech pathologist should be obtained and forwarded to Aviation Medicine Section, together with the DAME's own assessment of the condition and its likely effects on the safety of air navigation.

2.12.7 Sinuses

Applicants with acute sinusitis are "temporarily unfit" for aviation duties. Chronic sinusitis is unacceptable until appropriately referred, treated and improved.
2.13.1 Introduction

The increasing use of drugs, both prescribed and self-administered, within the Australian community, presents a significant challenge to DAMEs when determining an applicant’s fitness for aviation related duties. All drugs, even those purchased “over the counter (OTC)”, may have adverse effects that may render aircrew members or air traffic controllers unsafe to fly or to perform their normal duties.

General Principles

As a general principle, DAMEs should assume all medications are hazardous for aviation operations until demonstrated otherwise.

When assessing whether a pilot or Air Traffic Controller (ATC) taking medication is fit for aviation-related duties, two principal issues should be considered:

- The potential for the underlying medical condition to affect fitness for flying or controlling duty
- The potential for the treatment (including drug therapy) to reduce fitness for flying or controlling duty.

The following characteristics of specific compounds will influence the limitations on their safe use in the aviation environment:

- Unwanted, dose-related drug effects (e.g. blurred vision or drowsiness)
- Hypersensitivity/allergic reactions
- Idiosyncratic effects
- Drug side effects that may occur in some of the population (eg, nausea, liver damage or bone marrow suppression)
- Drug combination effects – potentiation
- Drug interactions; particularly with alcohol, to increase risk of side effects or reduce activity of the drug/s.
Virtually all drugs unacceptable for aviation duties, regardless of the nature of the disorder being treated, have one or more of the following effects:

- CNS depression
- CNS stimulation
- Autonomic nervous system disturbance
- Disturbance of equilibrium.

**Determination of Fitness for Aviation Duty when Taking Medications**

It is not practicable in this chapter to indicate whether a specific drug or even class of drug is always compatible with safe flying or controlling. Rather, this chapter provides a general overview of many commonly used medications and their use in the flying environment. Whenever a DAME is in doubt about a pilot or controller who is taking a drug or medication, advice should be obtained from the CASA Aviation Medicine Section.

With regard to their effect on fitness for aviation duties, medications may be divided into five groups:

A. Those medications considered safe when flying or controlling.

B. Those medications generally considered compatible with aviation duties without restrictions once the possibility of idiosyncratic reaction has been eliminated (generally after a period of ground trial). Applicants using these substances may be cleared to exercise the privileges of their licences by a DAME.

C. Those medications which may be compatible with aviation duties, but which require a specific assessment by CASA. Only CASA can clear pilots and ATCs to use these drugs while performing aviation-related duties.

D. Drugs that are not compatible with flying or ATC duties.

E. Those medications that do not fit any of the above groups, or where there is uncertainty. In such cases, the DAME should either:
   - Contact CASA’s Aviation Medicine Section prior to any decision to certificate or not certificate a licence holder or applicant; or
   - Not endorse the certificate and refer the matter to AMS for determination.
A. Medications compatible with flying or controlling

The following medications may be taken without consultation:

- Simple analgesics such as single doses of aspirin, paracetamol, and ibuprofen to provide analgesia may be used for minor self-limiting conditions. Paracetamol is preferable as there is less risk of gastric irritation. Medications containing Codeine should not be used for this purpose.

- Simple antacids may be used for mild isolated episodes of gastric disturbance. Mixtures containing anticholinergics or antispasmodics should not be used by an applicant engaged in aviation duties. Simple antacids do not include H₂ receptor antagonists.

- Antidiarrhoeals such as kaomagma, kapectate and bismuth subcitrate are acceptable for mild afebrile diarrhoea.

- Nasal sprays such as oxymetazoline or phenylephrine, to be used as a ‘get-me-down’ should unexpected ear or sinus block occur during flight.

- Non-prescription suppositories and topical anorectal ointments/creams used to treat simple haemorrhoids.

- Topical medications including antiseptics, topical acyclovir, antifungals, weak steroid creams or benzoyl peroxide used for minor wounds and skin conditions, vaginal creams/pessaries and suppositories.

  **Note**: Schedule 4 (prescription only) items such as topical antibiotics and tretinoin skin applications are not included.

- Oral Contraceptive Pill (combined OCP or mini-pill), injectable progesterone contraceptives and implantable progesterone contraceptives.

- Nicotine gum, patches or sprays used for smoking cessation.

- Steroid nasal sprays used to treat hay fever.

- Moistening or simple astringent eye drops

B. Medications requiring ground trial before DAME approval of use when flying or controlling

Pilots and ATCs taking the following medications require a ground trial (and/or AMS consultation) prior to DAME approval to fly or control:
2. Medical Aspects
2.13 Medication – Drugs and Flying/Controlling

- **Anaesthetics.** Medical certificate holders require clearance from a medical practitioner following the administration of any anaesthetic agent:
  - Minimum of 12 hours following local or regional (including dental) anaesthetics. (The condition for which the anaesthetic has been administered must also be considered prior to returning an individual to flying or controlling duties).
  - Minimum of 48 hours following general, spinal or epidural anaesthetic. This proscription includes drug-induced sedation. (The condition for which the anaesthetic etc has been administered must also be considered prior to returning an individual to flying or controlling duties).

- **Hypnotics.** Medical certificate holders should not fly or control for at least 12 hours after ingesting the sleep-inducing agent Temazepam. Medical certificate holders should not fly or control for at least 8 hours after using the sleep-inducing agent Zolpidem. Pilots and ATCs who use Temazepam or Zolpidem should not combine these drugs with alcohol. The use of the sleep-inducing agent Triazolam is not compatible with flying or controlling duties due to its potential CNS side effects. The use of Melatonin is not supported by CASA due to variation in its formulation and variability in its effects.

- **Antibiotics (oral and topical).** Medical certificate holders may continue to undertake flying or controlling duties when taking antibiotics provided:
  - the infectious condition being treated will not significantly interfere with aviation-related activities and will not be exacerbated by the specific operating environment, and
  - the prescribing medical practitioner or DAME has determined there are no adverse drug reactions from the antibiotic which has been prescribed. This would normally involve a short (approximately 48 hour) ground trial or previous use of the same antibiotic.

- **Immunisations.** Medical certificate holders should not undertake aviation-related duties for 24 hours after receiving the following vaccinations (primary and boosters):
  - Adult diphtheria and tetanus
  - Poliomyelitis
  - Hepatitis A & B
  - Measles, mumps, rubella
  - Yellow fever
  - Typhoid
  - Tuberculosis (Mantoux Test or Bacille Calmette-Guerin);
  - Influenza
  - Varicella
  - Meningococcal
  - Pneumococcal
  - Cholera.
Class 3 medical certificate holders receiving these vaccinations will usually remain fit for duty, but should consult a GP or DAME in individual cases of doubt.

After receiving the following immunisations (primary and boosters) there should be no aviation-related duties for a minimum of 72 hours:

- Japanese Encephalitis.

### Non-sedating antihistamines

C. Medications which may be compatible with aviation duties, but which require specific assessment by CASA

For many of the following medications, it is important to note that they will be prescribed to treat particular conditions. Refer to the relevant section regarding certification requirements for that condition as well as to the issues discussed here.

CASA approval is required prior to pilots and ATCs who are taking the following classes of medications returning to flying or controlling duties:

- **Sedating Antihistamines:**
  - These should only be used when there is at least 12 hours between use and commencing aviation-related duties.

- **Antihypertensives:**
  - ACE inhibitors
  - Calcium channel blockers
  - Diuretics
  - Beta blockers.

- **Antiarrhythmics:**
  - Quinidine
  - Disopyramide
  - Verapamil
  - Amiodarone
  - Digoxin.

- **Gout medications:**
  - Allopurinol (colchicine is not usually suitable)
  - Probenecid
  - Non-steroidal anti-inflammatory medications.

- **Hypolipidemic drugs:**
  - HMG-COA reductase inhibitors
  - Gemfibrozil (gemfibrozil and statin medications are not to be used together)
  - Cholestyramine (colestipol is not suitable).
2.13 Medication – Drugs and Flying/Controlling

- **Ophthalmological preparations:**
  - It is possible for patients to absorb sufficient beta-blocker through ocular administration to affect cardiovascular response to exertion/exercise.
    - Timolol (glaucoma)
    - Betaxolol (glaucoma).

- **Thyroid disease:**
  - Thyroxine requires a 14-day trial.

- **Antidepressants.**
  - Selected non-sedating selective serotonin reuptake inhibitors (SSRIs) require a minimum of 28 days ground trial. The underlying condition should be considered prior to returning the aviator to duty. MAOIs and tricyclic antidepressants are not generally considered compatible with aviation-related duties. (Also see section 2.6 Psychiatry.)

- **Other medications:**
  - Oral acyclovir or famcyclovir for genital herpes
  - Griseofulvin or terbinafine for systemic antifungal therapy requires a 28-day trial. Monthly liver function testing is required
  - Omeprazole for oesophagitis and peptic ulceration maintenance therapy, following endoscopic confirmation of ulcer healing
  - Ranitidine for peptic ulceration maintenance therapy, following endoscopic confirmation of ulcer healing
  - Clomiphene to enhance oogenesis
  - Sucralfate for non-ulcerative GI symptoms
  - Tetracycline (low dose, for long term treatment of acne)
  - Sulfasalazine for prophylaxis of well controlled ulcerative colitis
  - Sulfamethoxazole/trimethoprim for chronic urogenital tract infections.

When these classes of medications are prescribed, the following actions should be taken:

- **Ground trial:** The length of the ground trial will be determined on a case-by-case basis in consultation with CASA Aviation Medical staff, and will also depend on control of the underlying disorder and any side effects of the medication.

- **Consultation:** The DAME should contact CASA Aviation Medicine Section to discuss specific requirements for an applicant using or proposing to use any medication whose side effect profile is unknown or of possible concern.
D. Medications not acceptable for/not compatible with aviation related duties

The following medications are not compatible with aviation related duties and are never to be approved for use by a medical certificate holder without prior specific written approval by CASA.

- Narcotics
- Insulin
- Amphetamine
- Cytotoxics
- Psychotropic medications
- Anticoagulants
- Nitrates
- Complex antidiarrhoeals. Mixtures containing antispasmodics (eg, Lomotil, Imodium) are not usually compatible with aviation-related duties.

E. Other medications such as vitamins, minerals and herbal preparations

Aircrew are to treat herbal medications as they would any other OTC medication. There is a potential for unforeseen consequences when taking such preparations and aircrew and ATCs should consult a DAME for advice before taking such medications and performing aviation-related duties.

Vitamins, minerals and dietary supplements

In Australia, all medicinal therapeutic products must carry an AUST L or AUST R number on the label, unless exempt. Vitamins and minerals are considered listed therapeutic goods meaning quality and safety factors have been assessed by the Therapeutic Goods Administration. In general, pilots and ATCs should not exceed the Recommended Daily Allowances for these products.

Herbal preparations

Herbal preparations are widely available in the community, and are seen by many as a “natural” alternative to conventional medicine. Unfortunately, such agents are not always subject to the same stringent regulations that apply to registered medicinal compounds as noted above. In addition, many of these preparations contain agents that may interact with other drugs and have the potential to cause side effects that are incompatible with flight safety. CASA considers routine use of herbal preparations as being incompatible with flying or controlling duties.
Herbal preparations are derived from plant parts or oils. One should bear in mind that there are no standards for quality, potency, safety or efficacy in their manufacture. Identical products may differ markedly between manufacturers or batches by the same manufacturer. Additionally, many drugs are derived from the same plants used in the herbal preparations. Therefore, many herbal preparations have the same potential side effects as manufactured drugs.

Several herbal preparations present particular threats to aviation safety, alertness, or physical well-being. Below are some of the herbal preparations known to be potentially dangerous.

- **Hallucinogens.** The following may cause hallucinations or disorientation:
  - Californian poppy
  - European mandrake
  - Kava-kava
  - Magic mushrooms
  - Nutmeg (in doses greater than a tablespoon)
  - Periwinkle
  - Thorn apple
  - Yohimbe bark.

- **Sedatives.** The following may cause drowsiness, slow reaction time, or disorientation:
  - Celandine
  - Deadly Nightshade
  - Hemlock
  - Henbane
  - Hops
  - Indian snakeroot
  - Jimson weed
  - Jin bu huan
  - Opium poppy
  - Passion flower
  - Scopolia
  - Skullcap
  - Valerian
  - Wild lettuce
  - Wolfsbane.
2.13 Medication – Drugs and Flying/Controlling

- **Cardiovascular effects.** The following may cause heart palpitations or precipitate myocardial ischaemia/infarction.
  - Broom
  - Ephedra
  - Indian snakeroot
  - Lily of the Valley
  - Pheasant’s eye
  - Purple foxglove
  - Squill
  - Stophanthus
  - White squill
  - Yellow foxglove.

- **Liver poisons.** The following may cause drowsiness, slow reaction time, or disorientation:
  - Borage
  - Chapperal
  - Colts foot
  - Comfrey
  - Germander
  - Life root
  - Thread leafed groud sel.

The DAME often lacks clinical information sufficient to be able to quantify the aeromedical risk from use of herbal preparations. The following questions will be of benefit in evaluating the safety (or otherwise) of these agents:

- Is the use of the preparation due to signs or symptoms that suggest an underlying medical problem separate from the preparation in question?
- Is any component known to have neuropsychotropic effects?
- Is the preparation likely to contain unlabelled or incorrectly labelled ingredients?
- Is the preparation being used in a dose range far outside that of current experience or in an extremely concentrated form?
- Is any component of the preparation known to cause physical harm (even infrequently, unless the quantified incidence of adverse effects is known)?
- Is the preparation an alcohol-based tincture, tonic or elixir?

If all answers are negative, it is difficult to justify prohibition of the particular agent. Any positive answers must be dealt with by education, treating the underlying condition, not endorsing the medical certificate, or referring the matter to Aviation Medicine Section at CASA.
2.14 Malignancy

2.14.1 Introduction

Malignancy poses a threat to flight safety for a number of reasons including:

- Direct effect(s) of the primary tumour
- Effect(s) of secondary spread
- Effect(s) of treatment modalities
- Psychological effect
- Cachexia
- Endocrine or Biochemical disturbances.

Any pilot or Air Traffic Controller (ATC) diagnosed with a malignancy must refrain from aviation or air traffic control duties until fitness to return to such duties is assessed by CASA.

Automatic return to flying or controlling status should not be assumed. Some pilots and ATCs may be medically certificated following diagnosis and adequate treatment of their malignancy, provided there is an adequate program of ongoing surveillance. Others will require a lengthy period prior to certification due to ongoing symptoms or the risk of recurrence of the primary or metastatic spread. In some circumstances re-certification will not be approved.

Prior to medical certification on a pilot or ATC suffering from cancer, CASA must be sure that an applicant:

- Has recovered from the primary treatment
- Has no sign of residual tumour, of tumour spread or of secondary manifestations of tumour
- Is psychologically stable enough to undertake aviation duties.

Re-certification will depend on the likelihood and type of recurrent disease and the risk that it will adversely affect flight safety.
2.14 Principles of Aeromedical Certification of Pilots/ATCs with Malignancy

When considering the aeromedical risk (and therefore the risk to aviation safety) posed by a pilot or ATC suffering from a malignancy, CASA will evaluate:

- Cancer specific issues such as:
  - The type of cancer (tissue and histological diagnosis)
  - Likelihood of recurrence
  - Site of recurrence
  - Presence of any para-neoplastic syndromes
  - Potential for a recurrence to cause overt or subtle in-flight incapacitation.

- Issues related to the treatment of the cancer.

2.14.3 Cancer Specific Issues

Histological variants of a particular tissue cancer may behave biologically differently from other variants. Therefore, when assessing the aeromedical risk of a pilot or ATC with a malignancy, accurate tissue diagnosis of the malignancy is essential.

Complications of the Malignancy

Potential complications of malignancy will affect CASA’s assessment of fitness for aviation related duties. Malignancy may lead to pain, wasting, neuropathy, nausea, anorexia, seizures, hypercalcaemia, hyperuricaemia, viscus obstruction, and organ failure. Some cancers have para-neoplastic syndromes associated with their presence. These syndromes result from excessive or ectopic hormones synthesized by a tumour, immune complexes, ectopic receptor production, or release of physiologically active compounds and may manifest in a variety of ways. Most para-neoplastic syndromes have serious implications for aviation safety.

Likelihood of Recurrence

Figure 1 depicts the overall survival curve for individuals diagnosed with a theoretical malignancy. For most cancer types, annual recurrence rates can be calculated from survival curves. (As cure following recurrence is rare, overall survival approximates recurrence).
2.14 Malignancy

Staging

Recurrence rates are greatly influenced by the stage of disease when primary treatment occurred. Many cancers are staged using a TNM (Tumour, Node, Metastasis) classification. Figure 2 depicts the variation in survival rates for a theoretical cancer according to the degree of spread evident at diagnosis.

Tumour Marker

Tumours may synthesize proteins that produce no clinical symptoms, eg, \( \beta \)-human chorionic gonadotropin, \( \alpha \)-fetoprotein, carcinoembryonic antigen, CA 125, and CA 153. These protein products may be used as tumour markers in the serial evaluation of patients for determining disease recurrence or response to therapy. These markers may assist CASA in assessing the suitability of a pilot or ATC to return to aviation duty, as they can often be valuable in tracking response to treatment or recurrence of disease.
Site of recurrence

Each tumour has a characteristic pattern of recurrence. Thus for a theoretical tumour, metastases might occur according to the distribution indicated in Table 1.

Table 1: Distribution of metastasis for a theoretical cancer

<table>
<thead>
<tr>
<th>Site</th>
<th>Incidence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local and lymph nodes</td>
<td>60</td>
</tr>
<tr>
<td>Liver</td>
<td>20</td>
</tr>
<tr>
<td>Lung</td>
<td>10</td>
</tr>
<tr>
<td>Bone</td>
<td>5</td>
</tr>
<tr>
<td>Bone marrow</td>
<td>3</td>
</tr>
<tr>
<td>Brain</td>
<td>2</td>
</tr>
</tbody>
</table>

Risk of particular metastasis causing incapacitation

Several assumptions are made when assessing the risk of a particular metastasis causing incapacitation (either subtle or overt). For a theoretical cancer, recurrence in a regional lymph node carries a relatively small risk of incapacitation. On the other hand, brain metastasis has a near-100% potential for incapacitation (whether sudden due to a fit or bleed, or subtle as a result of pressure effects or headache etc). Thus the incapacitation risk weighting for a theoretical cancer may be as depicted in Table 2.

Table 2: Notional risk of incapacitation from metastasis

<table>
<thead>
<tr>
<th>Site</th>
<th>Incapacitation weighting (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local and lymph nodes</td>
<td>1</td>
</tr>
<tr>
<td>Liver</td>
<td>5</td>
</tr>
<tr>
<td>Lung</td>
<td>5</td>
</tr>
<tr>
<td>Bone</td>
<td>5</td>
</tr>
<tr>
<td>Bone marrow</td>
<td>20</td>
</tr>
<tr>
<td>Brain</td>
<td>100</td>
</tr>
</tbody>
</table>

Total risk of incapacitation

From the parameters defined above, a total risk of incapacitation can be calculated:

- Recurrence rate per year for the particular stage of the malignancy
- Frequency of metastatic disease in a particular organ
- Risk that metastasis in that organ will cause incapacitation.
Designated Aviation Medical Examiner's Handbook

2. Medical Aspects

2.14 Malignancy

Thus for an early stage cancer, the result of a calculation of the risk of incapacitation from brain metastasis may be:

\[ 3\% \times 3\% \times 100\% = 0.09\% \text{ for the first year} \]

For a theoretical late stage cancer from bone marrow metastases, the risk may be:

\[ 15\% \times 3\% \times 100\% = 0.45\% \text{ for the first year.} \]

In order to determine the overall risk, it is necessary to add the risks from all the possible recurrence sites.

2.14.4 Treatment Related Issues

In general, cancer is treated in one (or a combination) of the following ways:

- **Surgery** is the commonest treatment for malignant disease, and often is the only treatment. Aeromedical certification after surgery for cancer depends on the extent and success of the operation. Complications of surgery are considered on their merits, taking into account the underlying medical condition and the overall health of the affected individual.

- **Radiotherapy** is usually delivered as an intensive course. The aim may be curative, for example where an isolated group of lymph nodes have been shown to contain malignant cells, or as adjuvant therapy where lymph nodes are assumed to contain metastatic tumour. During the active part of radiotherapy treatment, pilots and ATCs will be assessed as temporarily unfit for duty. Following radiotherapy many patients suffer non-specific systemic effects, such as tiredness, malaise and nausea, which makes it inappropriate for them to partake in aviation activities at least until such effects have resolved. Occasionally there are long-term effects after radiotherapy, such as scarring, which may preclude fitness for aviation duties.

- **Chemotherapy.** During acute chemotherapy treatment (whether curative or adjuvant), pilots and ATCs will be assessed as temporarily unfit, as all chemotherapy drugs are cytotoxic, and frequently have a significant effect on normal tissue, such as rapidly dividing cells in the bone marrow. Once active chemotherapy has ceased and side effects have resolved, aeromedical certification may be possible and will be considered on a case-by-case basis. In some cases low doses of chemotherapy agents may be prescribed as maintenance therapy. Where CASA considers that such medications do not reduce aviation safety, aeromedical certification may be considered, also on a case-by-case basis.
2.14 Malignancy

- **Hormonal therapy.** Endocrine therapy is used as part of the treatment of some cancers (such as hormone and anti-hormone treatment following breast and prostate cancer). Pilots and ATCs may be returned to flying or controlling if there are no side effects from their hormonal therapy. In all cases, the decision to return to duty while on cancer chemotherapy will be made by CASA Aviation Medicine Section (AMS), on a case-by-case basis, when absence of adverse disease effects is confirmed.

- **Complementary or alternative medicine.** These modalities are commonly used by patients in the treatment of malignancy, particularly where the primary treatment modalities have failed to produce a cure. Where such treatments are used in the presence of continued active disease, the applicant is assessed as unfit. Where the treatment is used to prevent onset of malignancy or recurrence, the treatment will be considered on a case-by-case basis, with regard to the individual’s overall health and the potential effect of the treatment. Herbal medications are discussed in Section 2.13 Medication. All such cases should be referred to CASA AMS for consideration.

### 2.14.5 Specific Malignancies

The commonest forms of malignant disease in the Australian pilot and ATC population are (in order):

- Prostate cancer
- Malignant melanoma
- Bowel (colon) cancer
- Non-Hodgkin’s lymphoma
- Cancer of the testis (multiple types)
- Bladder cancer
- Kidney cancer
- Cancer of the rectum/anus
- Breast cancer
- Hodgkin’s lymphoma.

The following discussion relates to the five most commonly encountered malignancies in the aviation population in Australia, as well as Hodgkin’s Disease. Information on re-certification following diagnosis with such malignancies is to be taken as guidance and indicative only. CASA will address each case individually and make a decision based on its unique issues. In general, DAMEs and certificate applicants may anticipate an outcome along the lines described as a way to plan for possible grounding periods. Applicants should endeavour to provide specialist evidence and opinion to refute the guidance below should there be a request to return to multi-crew or solo flying or controlling prior to the times indicated.
**Prostate Cancer**

Adenocarcinoma of the prostate is the commonest malignancy in men aged 50 years or more in Australia, and the incidence increases with each decade of life. Hormonal influences undoubtedly play a role in the aetiology of adenocarcinoma. Grading is based on architectural patterns and is commonly reported as the Gleason score: the primary (most prevalent) grade (1-5) plus the secondary (next most prevalent) grade (1-5); thus, it ranges from 2 (very well differentiated) to 10 (very poorly differentiated). Staging is described in Table 3.

### Table 3: Staging of prostatic cancer

<table>
<thead>
<tr>
<th>Whitmore</th>
<th>AJCC/TNM</th>
<th>Characteristics of Tumour</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>Is clinically inappropriate by palpation or imaging</td>
</tr>
<tr>
<td></td>
<td>T1</td>
<td>Is an incidental finding in ≤ 5% of resected tissue</td>
</tr>
<tr>
<td></td>
<td>T1a</td>
<td>Is an incidental finding in &gt; 5% of resected tissue</td>
</tr>
<tr>
<td></td>
<td>T1b</td>
<td>Is identified by needle biopsy performed for an elevated prostate-specific antigen level</td>
</tr>
<tr>
<td></td>
<td>T1c</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>T2</td>
<td>Is palpable or reliably visible on imaging; is confined to prostate</td>
</tr>
<tr>
<td></td>
<td>T2a</td>
<td>Involves one lobe</td>
</tr>
<tr>
<td></td>
<td>T2b</td>
<td>Involves both lobes</td>
</tr>
<tr>
<td>C</td>
<td>T3</td>
<td>Extends through the prostatic capsule</td>
</tr>
<tr>
<td></td>
<td>T3a</td>
<td>Has extracapsular extension (unilateral or bilateral)</td>
</tr>
<tr>
<td></td>
<td>T3b</td>
<td>Invades seminal vesicles</td>
</tr>
<tr>
<td>D</td>
<td>T4</td>
<td>Is fixed or invades adjacent structures</td>
</tr>
</tbody>
</table>

**Symptoms, Signs, and Diagnosis**

Prostatic cancer is usually slowly progressive and may cause no symptoms. In late disease, symptoms of bladder outlet obstruction, ureteral obstruction, and hematuria may appear. Metastases to the pelvis, ribs, and vertebral bodies may cause bone pain. Carcinoma is often diagnosed incidentally when malignant changes are found in the tissue removed during surgery for suspected benign prostatic enlargement.

Elevated serum acid phosphatase or Roy test (an enzymatic method) correlates well with the presence of metastatic prostate cancer, particularly in lymph nodes. Although acid phosphatase and Prostatic Specific Antigen (PSA) levels decline after treatment and rise with recurrence, PSA is the more sensitive marker for monitoring cancer progression and response to therapy. However, because serum PSA is moderately elevated in 30 to 50% of patients with benign prostatic hyperplasia (depending on prostate size and degree of obstruction) and in 25 to 92% of those with prostate cancer (depending on tumour volume), its role in early detection and staging is unclear. Significantly elevated PSA levels suggest extracapsular extension of tumour or metastases.
2.14 Malignancy

Prognosis and Treatment

Long-term local control—even cure—is possible. However, the potential for cure, even in patients with clinically localized cancer, depends on factors such as grade, stage, and pretreatment PSA level. For patients with low-grade, organ-confined tumours, survival is virtually identical to that for age-matched controls without prostate cancer.

Most patients elect to undergo definitive therapy with radical prostatectomy or radiotherapy. Radical prostatectomy is probably optimal for younger patients with longer life expectancy; they have the lowest risk of urinary incontinence. Radiotherapy may offer comparable results, especially in patients with low pretreatment PSA levels.

An asymptomatic patient with a locally advanced tumour or metastases may benefit from hormonal therapy with or without adjuvant radiotherapy. Hormonal therapy rarely uses exogenous estrogens, which pose an increased risk of cardiovascular and thromboembolic complications.

Medical Certification

Cancer of the prostate has a generally good prognosis, and tends to metastasise locally or to bone. Once primary treatment has been completed, certification will be possible where:

- There is no evidence of metastatic spread
- PSA has returned to normal
- There are no significant consequences of treatment, such as incontinence.

Should there be metastatic spread which has been controlled and PSA has returned to less than 10, certification will also be considered. Certification will be for no more than 12 months. Each CASA medical examination and report must be accompanied by a progress report from a urologist or oncologist, and a recent PSA level. If the applicant shows no signs of recurrence after three years from initial diagnosis, no further follow-up is required. Where there is metastatic spread surveillance will likely be lifelong. Provided no other medical conditions preclude it, there can be a return to regular certification procedures for age and Class.

Malignant Melanoma

Malignant melanoma is the second commonest malignancy in the Australian aircrew and ATC population. The incidence is rising. Sun exposure is a risk, as is family history and the occurrence of lentigo maligna, large congenital melanocytic naevus, and the dysplastic naevus syndrome.

About 40 to 50% of malignant melanomas develop from pigmented moles. Almost all of the rest arise from melanocytes in normal skin. Signs of malignant transformation should be carefully sought: change in size; change in colour, especially spread of red, white, and blue pigmentation to surrounding normal skin; change in surface characteristics, consistency, or shape; and signs of inflammation in surrounding skin, with possible bleeding, ulceration, itching, or pain.
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Malignant melanomas vary in size, shape, and colour (usually pigmented) and in their propensity to invade and metastasize. This neoplasm may spread rapidly, causing death within months of its recognition, yet the 5-year cure rate of early, very superficial lesions is nearly 100%. Cure depends on early diagnosis and early treatment. The major types of malignant melanoma are:

- Lentigo maligna melanoma
- Superficial spreading melanoma: accounts for 2/3 of malignant melanomas
- Nodular melanoma: constitutes 10 to 15% of malignant melanomas

Prognosis and Treatment

Two classification systems are useful for evaluating melanomas:

- Melanoma thickness as measured from the granular layer of the epidermis to the greatest depth of tumour invasion, as described by Breslow.
- Anatomic level of invasion, as described by Clark. In Clark's classification, level I is confined to epidermis; level II extends into papillary dermis; level III extends further into papillary dermis, with expansion of this layer; level IV extends into reticular dermis; and level V extends into subcutaneous fat.

Increased Breslow thickness and deeper invasion (Clark level) correlate with poorer prognosis. The clinical type of tumour is less important to survival than the thickness of the tumour at the time of diagnosis.

Metastatic spread of melanoma occurs both via lymphatics and blood vessels. Local spread results in formation of nearby satellite papules or nodules that may or may not be pigmented. Direct metastasis to skin or internal organs may occur, and occasionally metastatic nodules or enlarged lymph nodes are discovered before the primary lesion is identified. Melanomas arising from mucous membranes have a very poor prognosis, although they often seem quite limited when discovered.

Treatment is by surgical excision. Although the width of margins is debated, most experts agree that a 1-cm lateral tumour-free margin is adequate for lesions <1 mm thick. Thicker lesions may deserve more radical surgery and sentinel node biopsy.

Thick malignant melanomas and regional or distant metastasis may be treated with chemotherapy. Prognosis is poor.
2.14 Malignancy

Table 4: Five-year survival for malignant melanoma

<table>
<thead>
<tr>
<th>Tumour Thickness (mm) *</th>
<th>5-Year Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76</td>
<td>98 - 100</td>
</tr>
<tr>
<td>0.76 - 1.5</td>
<td>90 - 94</td>
</tr>
<tr>
<td>1.51 – 2.25</td>
<td>83 – 84</td>
</tr>
<tr>
<td>2.26 – 3.0</td>
<td>72 – 77</td>
</tr>
<tr>
<td>&gt; 3.0</td>
<td>46</td>
</tr>
</tbody>
</table>

* Tumour thickness is very difficult to assess if histological signs of regression are present.

Aeromedical Certification

Following diagnosis of a malignant melanoma, CASA will not certificate a pilot or ATC for the first 12 months because of the risk of spread to organs such as the brain, lungs or bone. The associated risk of incapacitation is significant. In some circumstances where the prognosis is extremely positive, certification prior to 12 months may be considered.

Class 1 and 3: In the absence of recurrence, CASA will usually approve Class 1 and 3 certification as follows:

Table 5: Post-malignant melanoma certification (Class 1 and 3)

<table>
<thead>
<tr>
<th>Tumour thickness</th>
<th>Certification</th>
<th>Period post-diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>0.76 – 1.49 mm</td>
<td>Multicrew</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>24 months</td>
</tr>
<tr>
<td>1.5 – 2.24 mm</td>
<td>Multicrew</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>36 months</td>
</tr>
<tr>
<td>2.25 – 3.0 mm</td>
<td>Multicrew</td>
<td>24 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>48 months</td>
</tr>
<tr>
<td>&gt; 3.0 mm</td>
<td>Multicrew</td>
<td>24 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>60 months</td>
</tr>
</tbody>
</table>
Class 2: In the absence of recurrence, CASA will usually approve Class 2 certification as follows:

<table>
<thead>
<tr>
<th>Tumour thickness</th>
<th>Certification</th>
<th>Period post-diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>0.76 – 1.49 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>1.5 – 2.24 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>2.25 – 3.0 mm</td>
<td>As or with co-pilot</td>
<td>12 months</td>
</tr>
<tr>
<td>&gt; 3.0 mm</td>
<td>As or with co-pilot</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>24 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>36 months</td>
</tr>
</tbody>
</table>

Certification will be for no more than 12 months, and renewal medical examinations and reports must be accompanied by a progress report from the treating dermatologist or oncologist. These reports will be required for at least 3 years following return to unrestricted duties.

Colorectal (Bowel) Cancer

In Western countries, cancers of the colon and rectum account for more new cases of cancer per year than cancer of any other anatomical site except the lung. Colorectal cancer is the most frequent cause of death from visceral malignancies that affect both sexes. The incidence of this condition begins to rise at age 40 and peaks at age 60 to 75 years. Colorectal cancer spreads by direct extension through the bowel wall, haematogenous metastasis, regional lymph node metastasis, perineural spread, and intraluminal metastasis.

Symptoms, Signs, and Diagnosis

Adenocarcinoma of the colon and rectum grows slowly, and a long interval elapses before it is large enough to produce symptoms. Early diagnosis depends on routine examination. Symptoms depend on the lesion's location, type, extent, and complications. In cancer of the rectum, the commonest presenting symptom is bleeding with defecation. Whenever rectal bleeding occurs, even with obvious haemorrhoids or known diverticular disease, coexisting cancer must be excluded. Simple, inexpensive testing of the stool for occult blood is advised as part of both screening and high-risk surveillance programs.

Elevated serum carcinoembryonic antigen (CEA) is not specifically associated with colorectal cancer, but levels are high in 70% of affected patients. If CEA is high preoperatively, and low after removal of a colon tumour, monitoring CEA may help to detect recurrence.
Treatment and Prognosis

Primary treatment consists of wide surgical resection of the colon cancer and regional lymphatic drainage. The choice of operation for rectal cancer depends on the tumour's distance from the anus and gross extent. Abdominoperineal resection of the rectum requires a permanent sigmoid colostomy. Surgical cure is possible in 70% of patients. The best 5-yr survival rate for cancer limited to the mucosa approaches 90% (stage I, Dukes' A); with penetration of the muscularis propria, 80% (stage II, Dukes' B); with positive lymph nodes, 30% (stage III, Dukes' C).

Medical Certification

Issues dealing with colostomy and ileostomy are found in Section 2.9 Gastroenterology.

Following diagnosis of a bowel cancer, CASA will not usually certificate a pilot or ATC for the first 12 months because of the risk of spread to organs such as the brain, lungs or bone and the associated risk of incapacitation is significant. CASA will require the following information when considering the fitness of a pilot or ATC to return to aviation-related duties following the diagnosis of colorectal cancer: an annual report from the treating gastroenterologist and/or oncologist, including tissue diagnosis, staging and CEA level, for at least 5 years post-diagnosis.

In the absence of recurrence, CASA will usually approve certification as follows:

**Stage I**

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>6 months</td>
</tr>
<tr>
<td>Solo</td>
<td>24 months</td>
</tr>
</tbody>
</table>

**Class 2**

| Solo | 6 months |

**Stage II**

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>12 months</td>
</tr>
<tr>
<td>Solo</td>
<td>36 months</td>
</tr>
</tbody>
</table>

**Class 2**

| Solo | 12 months |
Stage III

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>24 months</td>
</tr>
<tr>
<td>Solo</td>
<td>648 months</td>
</tr>
<tr>
<td>Class 2</td>
<td></td>
</tr>
<tr>
<td>As or with co-pilot</td>
<td>12 months</td>
</tr>
<tr>
<td>Solo</td>
<td>24 months</td>
</tr>
</tbody>
</table>

Non-Hodgkin’s Lymphoma

Non-Hodgkin’s Lymphoma is a malignant monoclonal proliferation of lymphoid cells in sites within the immune system, including lymph nodes, bone marrow, spleen, liver, and gastrointestinal tract. Pathological classification of non-Hodgkin’s lymphomas (NHL) is evolving, reflecting new insights into the cells of origin and the biological bases of these heterogeneous diseases. The course of NHL varies from indolent and initially well tolerated to rapidly fatal.

Incidence and Aetiology

NHL occurs more often than Hodgkin’s disease. Its cause is unknown, although, as with the leukaemias, substantial experimental evidence suggests a viral cause for some lymphomas. Primary CNS involvement and disseminated disease occur. In about 30% of cases, the lymphomas are preceded by generalized lymphadenopathy.

Pathology

The Working Formulation classifies NHL into prognostic categories having therapeutic implications as follows:

- **Low-grade lymphomas** (38%): Diffuse, small lymphocytic; follicular, small-cleaved cell; follicular mixed, small and large cell.
- **Intermediate-grade lymphomas** (40%): Follicular large cell; diffuse, small-cleaved cell; diffuse mixed, small and large cell; diffuse large cell.
- **High-grade lymphomas** (20%): Immunoblastic lymphoma; lymphoblastic lymphoma; small non-cleaved cell lymphoma (Burkitt’s and non-Burkitt’s types).
- **Miscellaneous lymphomas** (2%): Composite lymphomas; mycosis fungoides; true histiocytic; other, and unclassifiable types.
Symptoms and Signs

Although various clinical manifestations of NHL occur, many patients present with asymptomatic peripheral lymphadenopathy. Enlarged lymph nodes are rubbery and discrete and later become matted. Local disease is apparent in some patients, but most have multiple areas of involvement. Anaemia is initially present in about 33% of patients and eventually develops in most.

Staging

Localised NHL does occur, but the disease is disseminated when first recognized in about 90% of follicular lymphomas and 70% of diffuse lymphomas. The final staging of NHL is similar to that of Hodgkin’s disease; however, it is more often based on clinical than pathological findings.

Table 7: Ann Arbor Staging of Hodgkin’s Disease and Non-Hodgkin’s Lymphoma

<table>
<thead>
<tr>
<th>Stage *</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>In one lymph node only</td>
</tr>
<tr>
<td>II</td>
<td>In two or more lymph nodes on the same side of the diaphragm</td>
</tr>
<tr>
<td>III</td>
<td>In the lymph nodes, spleen, or both and on both sides of the diaphragm</td>
</tr>
<tr>
<td></td>
<td>1 Above the renal vessels (eg, spleen; splenic, hilar, coeliac and portal nodes)</td>
</tr>
<tr>
<td></td>
<td>2 In the lower abdomen (periaortic, pelvic, or inguinal nodes)</td>
</tr>
<tr>
<td>IV</td>
<td>Extranodal involvement (eg, bone marrow, lung, liver)</td>
</tr>
</tbody>
</table>

*Subclassification E indicates extranodal involvement adjacent to an involved lymph node (eg, disease of mediastinal nodes and hilar adenopathy with adjacent lung infiltration is classified as stage II E). Stages can be further classified by A to indicate the absence; or B to indicate the presence of constitutional symptoms (weight loss, fever, or night sweats). B symptoms generally occur with stages III and IV (20 to 30% of patients).

Initially, constitutional symptoms tend to be less common in NHL than in Hodgkin’s disease and do not usually alter prognosis. Organ infiltration is more widespread in NHL, and the bone marrow and peripheral blood may be involved.

Prognosis and Treatment

The histopathology, stage of disease, and results of surface marker studies significantly influence the prognosis and response to treatment. Patients with T-cell lymphomas generally have a worse prognosis than those with B-cell types. Other factors that adversely affect prognosis are poor performance status, age >60 years, elevated LDH level, bulky tumour masses (diameter >10 cm), and more than two extranodal sites of disease.

A prognostic index for diffuse mixed, diffuse large cell, and immunoblastic lymphomas has been reported. The International Prognostic Index (IPI) considers five categories: age, performance status, LDH level, number of extranodal sites, and stage. Prognostic groups of low, low intermediate, high intermediate, and high risk may be defined.
2.14 Malignancy

Table 8: Outcome According to Risk Group as Defined by the International Prognostic Index

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Risk Factors (n)</th>
<th>Patients * (%)</th>
<th>Complete Response (%)</th>
<th>2-Yr Relapse-Free Survival (%)</th>
<th>5-Yr Relapse-Free Survival (%)</th>
<th>2-Yr Survival (%)</th>
<th>5-Yr Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>0 or 1</td>
<td>35</td>
<td>87</td>
<td>79</td>
<td>70</td>
<td>84</td>
<td>73</td>
</tr>
<tr>
<td>Low - intermediate</td>
<td>2</td>
<td>27</td>
<td>67</td>
<td>66</td>
<td>50</td>
<td>66</td>
<td>51</td>
</tr>
<tr>
<td>High - intermediate</td>
<td>3</td>
<td>22</td>
<td>55</td>
<td>59</td>
<td>49</td>
<td>54</td>
<td>43</td>
</tr>
<tr>
<td>High</td>
<td>4 or 5</td>
<td>16</td>
<td>44</td>
<td>58</td>
<td>40</td>
<td>34</td>
<td>26</td>
</tr>
</tbody>
</table>


A cure may be expected in 30 to 50% of affected patients with intermediate- and high-grade lymphomas undergoing myeloablative therapy. In low-grade lymphomas, it remains uncertain whether cure may be obtained with transplantation, although their survival rate is better than that of patients receiving secondary palliative therapy alone.

Medical Certification

Without a complete remission, return to aviation duties will not usually be considered. Once in remission, certification will usually be conducted on a case-by-case basis, using Table 9 (see next page) as a guide. The high rate of late recurrence limits the likelihood of an unrestricted Class 1 or Class 3 certification.

Table 9: Post-remission certification

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Class 1 &amp; 3 solo</th>
<th>Class 1 &amp; 3 multi-crew/no solo controlling</th>
<th>Class 2 solo</th>
<th>Class 2 as or with co-pilot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>4 years</td>
<td>2 years</td>
<td>2 years</td>
<td>1 year</td>
</tr>
<tr>
<td>Low - intermediate</td>
<td>5 years</td>
<td>2 years</td>
<td>3 years</td>
<td>1 year</td>
</tr>
<tr>
<td>High - intermediate</td>
<td>Certification unlikely</td>
<td>2 years</td>
<td>4 years</td>
<td>2 years</td>
</tr>
<tr>
<td>High</td>
<td>Certification unlikely</td>
<td>2 years</td>
<td>5 years</td>
<td>3 years</td>
</tr>
</tbody>
</table>

Timing is after a complete remission has been obtained.

Applications for renewal of a medical certificate must be accompanied by a progress report from the treating haematologist or oncologists detailing treatment, prognosis and current health. Certification will be for a maximum of 12 months until at least 5 years post-re-certification, and at least 3 years following return to unrestricted duties.
Hodgkin's Disease

Hodgkin's Disease is a localised or disseminated malignant proliferation of tumour cells arising from the lymphoreticular system, primarily involving lymph node tissue and bone marrow.

Incidence and Aetiology

Hodgkin's disease has a bimodal age distribution that peaks at ages 15 to 34 and after age 60. However, the second peak may be an artefact of inaccurate diagnosis, because most cases diagnosed after age 60 are intermediate-grade non-Hodgkin's lymphomas.

Pathology

Diagnosis depends on identification of Reed-Sternberg cells (large binucleated cells) in lymph nodes or at other sites.

Table 10: Histopathological Subtypes of Hodgkin's Disease

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance</th>
<th>Incidence</th>
<th>Progression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lymphocyte predominant</td>
<td>Few Reed-Sternberg cells and many lymphocytes</td>
<td>3%</td>
<td>Relatively slow or indolent</td>
</tr>
<tr>
<td>Nodular sclerosis</td>
<td>Dense fibrous tissue surrounds nodules of Hodgkin's tissue</td>
<td>67%</td>
<td>Intermediate or moderately progressive; relatively slow or indolent (occasionally)</td>
</tr>
<tr>
<td>Mixed cellularity</td>
<td>A moderate number of Reed-Sternberg cells with a mixed background infiltrate</td>
<td>25%</td>
<td>Intermediate or moderately progressive; aggressive</td>
</tr>
<tr>
<td>Lymphocyte-depleted</td>
<td>Numerous Reed-Sternberg cells and extensive fibrosis</td>
<td>5%</td>
<td>Aggressive</td>
</tr>
</tbody>
</table>

Symptoms and Signs

Symptoms and signs primarily relate to the site, amount, and extent of nodal mass involvement. Most patients present with cervical and mediastinal adenopathy and without systemic complaints. Other manifestations develop as the disease spreads through the reticuloendothelial system, generally among contiguous sites. The rate of progression varies according to histopathological subtype.

Diagnosis

Hodgkin's disease can be definitively diagnosed by lymph node biopsy that reveals Reed-Sternberg cells in a characteristic histological setting. Hodgkin's disease may be difficult to differentiate from lymphadenopathy caused by infectious mononucleosis, toxoplasmosis, cytomegalovirus, NHL, or leukaemia.
Staging

Radiotherapy, chemotherapy, or a combination of both is potentially curative, but the extent or stage of disease must first be determined. The Ann Arbor staging system (see Non-Hodgkin’s Lymphoma) is commonly used.

Treatment

Chemotherapy or radiotherapy regimens cure most patients.

- **Stage I and IIA disease** can be treated with radiotherapy. Such treatment cures about 80% of patients. Cure refers to being disease-free at 5 years post-therapy, after which relapse is very rare.

- For **stage IIIA1 disease**, total nodal irradiation results in an overall survival of 85 to 90%, with disease-free survival of 65 to 75% at 5 years.

- For **stage IIIA2 disease**, combination chemotherapy is generally used with or without radiotherapy of bulky nodal sites. Cure rates of 75 to 80% have been achieved.

- Because radiotherapy alone does not cure **stage IIIB disease**, combination chemotherapy alone or in conjunction with radiotherapy is required. Survival ranges from 70 to 80% (at 5 years).

- For **stage IVA and B disease**, combination chemotherapy has produced a complete remission in 70 to 80% of patients, with >50% remaining disease-free at 10 to 15 years. Patients who fail to achieve complete remission or who relapse within 6 to 12 months have a poor prognosis.

Medical Certification

CASA will not usually consider certification until at least 12 months following successful treatment. “Successful treatment” requires that the disease be in complete remission. Table 11 (below) provides guidance on the likely time before CASA will consider certification, assuming that there are no other significant health issues, no side effects from the treatment and ongoing complete remission or “cure” has been effected. All renewal medical examinations and reports must be accompanied by a progress report from the treating haematologist or oncologist.

**Table 11: Likely certification timings**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Class 1 &amp; 3 solo</th>
<th>Class 1 &amp; 3 multi-crew/no solo controlling</th>
<th>Class 2 solo</th>
<th>Class 2 as or with co-pilot</th>
</tr>
</thead>
<tbody>
<tr>
<td>I and IIA</td>
<td>1 year</td>
<td>6 months</td>
<td>1 year</td>
<td>6 months</td>
</tr>
<tr>
<td>IIIA1</td>
<td>2 years</td>
<td>1 year</td>
<td>2 years</td>
<td>6 months</td>
</tr>
<tr>
<td>IIIA2</td>
<td>3 years</td>
<td>2 years</td>
<td>2 years</td>
<td>1 year</td>
</tr>
<tr>
<td>IIIB and IV</td>
<td>4 years</td>
<td>2 years</td>
<td>3 years</td>
<td>1 year</td>
</tr>
</tbody>
</table>
Testicular Cancer

Testicular tumours account for most solid tumours in males aged less than 30 years. Malignant testicular tumours arise from the primordial germ cell and differentiate to reveal seminoma, teratoma, embryonal carcinoma, endodermal sinus tumour (yolk sac tumour), and choriocarcinoma.

Symptoms, Signs, and Diagnosis

The usual presenting sign is a scrotal mass, sometimes associated with pain. Many patients discover the mass in association with minor trauma. Haemorrhage into the tumour may produce local pain and tenderness. Any firm mass in the testis is cause for immediate clinical suspicion of testicular tumour. Diagnostic studies should include radioimmunoassays for $\alpha$-fetoprotein and $\beta$-human chorionic gonadotropin. These markers, when elevated, indicate the presence of tumour; they are also valuable in follow-up of patients with proven testicular tumours, especially the non-seminomatous types.

Prognosis and Treatment

Prognosis depends on the histology and extent of the tumour. Survival rates are >95% at 5 years for seminomas and non-seminomas localized to the testis or low-volume metastases in the retroperitoneum. The 5-year survival rate for extensive retroperitoneal metastases or pulmonary or other visceral metastases is poorer and varies with site, volume, and histology of the metastases.

Radical (inguinal) orchidectomy, the cornerstone of treatment, provides important histopathological information for planning further therapy. These parameters can accurately predict the risk of occult lymph node metastases; so low-risk patients with normal x-rays and biomarkers may be candidates for surveillance protocols, especially patients with non-seminomatous germ cell tumours rather than seminomas. Otherwise, standard treatment for seminoma is irradiation after unilateral orchidectomy. For non-seminomatous germ cell tumours, standard treatment is retroperitoneal lymph node dissection.

Medical Certification

Stage 1 (non-metastatic disease):

- **Teratoma with orchidectomy only.** Following recovery from the surgery, unrestricted Class 1, 2 or 3 is usual. For the first 24 months, certification is for 6 months at a time. Each medical is to be accompanied by a report from urologist or oncologist, along with tumour marker levels. Tumour markers will usually rise before any anatomical disease is identifiable. After two years without recurrence, this can increase to 12 monthly certification, until 5 years post-diagnosis.
2.14 Malignancy

- **Seminoma with orchidectomy only.** There is a 15% relapse rate. This is usually monitored by serial CT or MRI scans. Unrestricted Class 1 or 3 certification will be delayed for 24 months post-surgery. Restricted Class 1 and 3 and unrestricted Class 2 is possible from recovery after surgery. Certification will be for 6 months for the first two years, then annual until 5 years post-diagnosis.

- **Seminoma with orchidectomy and radiotherapy.** As the cure rate is greater than 99%, unrestricted Class 1, 2 and 3 certification is possible as soon as the individual has recovered from the primary treatment. Certification again will be for 6 months for the first 2 years, then annual, and the medical must be accompanied by a progress report from the treating urologist or oncologist.

**Stage II/III (local metastatic disease):** The prognosis remains good compared with most other malignancies.

*Table 12: Stage II/III (local metastatic disease)*

<table>
<thead>
<tr>
<th>Class 1/3 multi-crew/no solo controlling</th>
<th>Following recovery from primary treatment and disease free</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1/3 solo</td>
<td>12 months following successful treatment</td>
</tr>
<tr>
<td>Class 2 as or with co-pilot</td>
<td>Following recovery from primary treatment and disease free</td>
</tr>
<tr>
<td>Class 2 solo</td>
<td>6 months following successful treatment</td>
</tr>
</tbody>
</table>

Renewal medical examinations and reports must be accompanied by a progress report from the treating specialist.

**Stage IV (disseminated disease):** Although 5-year survival is around 60-70%, this outcome is usually achieved only by prolonged chemotherapy. While chemotherapy is required, there will be no certification.

*Table 13: Stage IV (disseminated disease)*

<table>
<thead>
<tr>
<th>Class 1/3 multi-crew/no solo controlling</th>
<th>24 months following successful treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1/3 solo</td>
<td>Certification unlikely</td>
</tr>
<tr>
<td>Class 2 as or with co-pilot</td>
<td>12 months after last treatment and continued disease free</td>
</tr>
<tr>
<td>Class 2 solo</td>
<td>24 months following successful treatment</td>
</tr>
</tbody>
</table>

Renewal medical examinations and reports must be accompanied by a progress report from the treating specialist.

**Other Malignancies**

This section is not intended to provide detailed advice for all possible malignancies. Other malignancies may be discussed in the relevant organ system section of this *Handbook*. Otherwise, the guiding principles outlined above should be used. Where doubt exists, discussion with, or referral to, CASA Aviation Medicine Section should be undertaken immediately.
Blank page
2.15 Differences between Australian Medical Certification and ICAO Medical Certification for International Operations

2.15.1 Currency of Medical Certification

ICAO commences periods of currency from the date of the medical examination, not from the date of CASA's assessment nor from the applicant's anniversary date. As an aide-memoire to applicants, CASA's medical certificates record the date on which the applicant's most recent medical examination was performed, to assist calculation of the medical certificate's currency for ICAO purposes. (See the Note below.)

2.15.2 Duration of Medical Certification

Class 1 medical certificates

For applicants with ATPL who are aged 40 years or more, ICAO demands a medical examination by a DAME every six months. That is, the currency of medical certification for this group extends for only six months from the date of the most recent medical examination.

Class 2 medical certificates

ICAO demands a medical examination by a DAME every two years for all Class 2 medical certificate holders. That is, the currency of medical certification for this group extends for only two years from the date of the most recent medical examination.

As an aide-memoire to applicants, CASA's medical certificates record the date on which the applicant's most recent medical examination was performed, to assist calculation of the medical certificate's currency for ICAO purposes. (See the Note below.)

Note: This has no effect on the notified currency of medical certificates when exercising licence privileges within Australian airspace.

This advice is provided to all Class 1 or Class 2 medical certificate holders whenever a CASA medical certificate is issued.
2. Medical Aspects
2.15 Differences between Australian Medical Certification and ICAO Medical Certification for International Operations
3.1.1 Questions to be Asked of CASA Employees for Superannuation Medicals

The following are questions to be asked during Superannuation Medicals (Class 3 Medical Certificate holders and pilots to be employed by CASA).

1. Have you ever been rejected:
   a. As a risk for life insurance?
   b. For admission to any employment for health reasons?
   c. For entry into any superannuation scheme?

2. Have you ever been retired or have your services ever been terminated from any employment on medical or invalidity grounds?

3. Are you receiving, or have you ever received:
   a. A pension or any other benefit from the Commonwealth Superannuation Scheme, the Defence Force Retirement and Death Benefits Scheme, or any other government or private superannuation scheme?
   b. Workers’ or employees’ compensation?
   c. A Social Security invalidity pension or sickness benefit?
   d. A Repatriation service pension?
   e. A Repatriation disability pension? If so, please state award rate.
3. Superannuation Medicals

3.1 Questions for Superannuation Medicals

Blank page
4. Aviation Medicine Telephone Numbers and Addresses

4.1 Telephone List

4.1.1 Aviation Medicine Telephone Contact as at December 2000

<table>
<thead>
<tr>
<th>CASA National Office (at the cost of a local telephone call)</th>
<th>131 757</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inquiries</td>
<td>(02) 6217 1641</td>
</tr>
<tr>
<td>Facsimile</td>
<td>(02) 6217 1640</td>
</tr>
</tbody>
</table>
Designated Aviation Medical Examiner’s Handbook

4. Aviation Medicine Telephone Numbers and Addresses

4.2 CASA Offices

Approved by Assistant Director, Aviation Safety Standards  Version 3.0: December 2003

4.2.1 Head Office

Aviation Medicine Section
Cnr Barry Drive & Northbourne Avenue
CANBERRA ACT 2601

GPO Box 1544
CANBERRA CITY ACT 2601

4.2.2 Area Offices

<table>
<thead>
<tr>
<th>Office</th>
<th>Address</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney Basin</td>
<td>PO Box CPS Condell Park</td>
<td>(02) 97803050</td>
</tr>
<tr>
<td></td>
<td>NSW  2200</td>
<td></td>
</tr>
<tr>
<td>NT and Kimberleys</td>
<td>PO Box 41196 Casuarina</td>
<td>(08) 89432999</td>
</tr>
<tr>
<td></td>
<td>NT  0811</td>
<td></td>
</tr>
<tr>
<td>South Queensland</td>
<td>39 Navigator Place Hendra Qld</td>
<td>(07) 3632 4051</td>
</tr>
<tr>
<td></td>
<td>4051</td>
<td></td>
</tr>
<tr>
<td>North Queensland</td>
<td>PO Box 7740 Garbutt Qld</td>
<td>(07) 4750 2671</td>
</tr>
<tr>
<td></td>
<td>4814</td>
<td></td>
</tr>
<tr>
<td>NSW Country Office</td>
<td>GPO Box 2005 Canberra ACT</td>
<td>131757</td>
</tr>
<tr>
<td></td>
<td>2601</td>
<td></td>
</tr>
<tr>
<td>Victoria Tasmania</td>
<td>PO Box 20 Moorabbin VIC</td>
<td>131757</td>
</tr>
<tr>
<td></td>
<td>3189</td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>PO Box 126 PBC Adelaide SA</td>
<td>(08) 8422 2904</td>
</tr>
<tr>
<td></td>
<td>5950</td>
<td></td>
</tr>
<tr>
<td>West Australia</td>
<td>GPO Box 1082 CLOVERDALE WA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6105</td>
<td></td>
</tr>
</tbody>
</table>
5. Colour Vision Testing

5.1 Locations for Colour Vision Testing

5.1.1 Locations by State

| Australian Capital Territory | Dr D Batagol  
Dickson Park Professional Centre  
Unit 5, Cnr Cowper and Antill Street  
DICKSON ACT 2602  
Tel: (02) 6249 7177 |
| New South Wales | School of Optometry  
Ms Kerry Dreyer  
University of New South Wales  
KENSINGTON NSW 2033  
Tel: (02) 9385 4624 or (02) 9385 4628  
Dr P Duke  
135 Macquarie Street  
SYDNEY NSW 2000  
Tel: (02) 9247 3557 |
| Northern Territory | Dr M I Mahmood  
Darwin Private Hospital  
Rocklands Drive  
CASUARINA NT 0810  
Tel: (08) 8920 6049 |
| Queensland | Optometry Clinic, School Of Optometry  
O Block Kelvin Grove Campus  
Victoria Park Road  
KELVIN GROVE QLD 4059  
Tel: (07) 3864 5739  
Please specify on making an appointment, an "Aviation Colour Vision Test" to be supervised by Miss J Bevan.  
Dr W Talbot  
14 Fulham Rd  
PIMLICO TOWNSVILLE QLD 4812  
Tel: (07) 4775 1633 |
### 5. Colour Vision Testing

#### 5.1 Locations for Colour Vision Testing

<table>
<thead>
<tr>
<th>State</th>
<th>Contact Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queensland (cont.)</td>
<td>Captain Henry Thein (Northern Ports) Marine Operations, Queensland Transport 64-66 Tingira Street PORTSMITH CAIRNS QLD 4870 Tel: (07) 4052 7400 Fax: (07) 40351127</td>
</tr>
<tr>
<td>South Australia</td>
<td>Dr J L Crompton 22 Walter Street NORTH ADELAIDE SA 5006 Tel: (08) 8267 3211</td>
</tr>
<tr>
<td>Tasmania</td>
<td>Defence Forces Recruiting Medical Section Anglesea Barracks, Davie Street HOBART TAS 7000 Tel: (03) 6237 7327</td>
</tr>
<tr>
<td>Victoria</td>
<td>Victorian College of Optometry 374 Cardigan St CARLTON VIC 3053 Tel: (03) 9349 7400 <strong>Note:</strong> Please state “Aviation Colour Vision Test” when making an appointment – to be supervised by Kay Lian Dr J Parkes 54 Station Place SUNSHINE VIC 3020 Tel: (03) 9312 0800</td>
</tr>
<tr>
<td>Western Australia</td>
<td>Ms Lisa Biggs Lincoln House Suite No3 No4 Ventnor Avenue WEST PERTH WA 6005 Tel: (08) 9485 1440</td>
</tr>
</tbody>
</table>
### 6.1.1 List of Forms

<table>
<thead>
<tr>
<th>Former Form No.</th>
<th>New CASA Form No.</th>
<th>Title</th>
<th>Available From</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVM 010</td>
<td>093</td>
<td>Authority Audiogram</td>
<td>J.S. McMillan</td>
</tr>
<tr>
<td>AVM 011</td>
<td>094</td>
<td>ECG</td>
<td>Phone: 02 9795 1222 (Australia) +61 2 9795 1222 (International)</td>
</tr>
<tr>
<td>AVM 006</td>
<td>097</td>
<td>Medical Questionnaire and Examination Form—R</td>
<td>P.O Box 136 Regents Park NSW 2143</td>
</tr>
<tr>
<td>AVM 012</td>
<td>098</td>
<td>Medical Questionnaire and Examination Form—O</td>
<td></td>
</tr>
<tr>
<td>AVM 007</td>
<td>099</td>
<td>Eye Examination Report—V</td>
<td></td>
</tr>
<tr>
<td>AVM 005</td>
<td>172</td>
<td>Medical Certificate</td>
<td>Aviation Medicine Section, Canberra</td>
</tr>
<tr>
<td>AVM 008</td>
<td>755</td>
<td>Application for Appointment or Reappointment as Designated Aviation Medical Examiner or Designated Aviation Ophthalmologist (under Regulation 6.02 of the Civil Aviation Regulations)</td>
<td>The CASA website</td>
</tr>
</tbody>
</table>
6. Aviation Medicine Forms
6.1 Form Details and Availability

Approved by Assistant Director, Aviation Safety Standards  Version 3.0: December 2003

Blank page
BODY MASS INDEX CHART

Weight For Height Chart
(For Men and Women from 18 years onward)

Based on Body Mass Index (BMI) in Range of 18, 20, 25, 30.

\[ \text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}} \]
PEAK EXPIRATORY FLOW IN NORMAL SUBJECTS


The diagram illustrates the peak expiratory flow (PEF) for men and women across different age groups and heights. The curves represent the median values for men and women, with standard deviations provided for reference. The PEF values are measured in liters per minute (L/min), and the age range is from 15 to 70 years. The diagram also includes notes indicating that values up to 500 L/min are considered normal, while values less than 500 L/min are below predicted levels.
1. Revision History
## Coronary Heart Disease

### Risk Factor Prediction Chart

**1. Find Points for each Risk Factor**

<table>
<thead>
<tr>
<th>Age (if Female)</th>
<th>Age (if Male)</th>
<th>HDL Cholesterol</th>
<th>Total Cholesterol</th>
<th>Systolic Blood Press</th>
<th>Other</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>Age Pts</td>
<td>Age Pts</td>
<td>Age Pts</td>
<td>Age Pts</td>
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<td>56-60</td>
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<td>35</td>
<td>-5</td>
<td>61-67</td>
<td>10</td>
<td>37-38</td>
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**2. Sum Points for all Risk Factors**

\[
\text{Age } (\text{Pts}) + (\text{HDL-C })(\text{Pts}) = \text{Total-C } (\text{Pts}) + \text{SBP } (\text{Pts}) + \text{Smoker } (\text{Pts}) + \text{Diabetes } (\text{Pts}) + \text{ECG-LVH } (\text{Pts}) = \text{Point Total}
\]

**NOTE: Minus points subtract from total**

**3. Look up risk corresponding to point total**

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**4. Compare to ave 10 year risk**

Modified from Chart by the American Heart Association, April 2002
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

Published by permission of Dr. D.R. Jones from ‘Psychiatric Factors in Civil Aviation Medicine’. David R. Jones, MD, MPH. 10 January 2001. This is extracted from material provided by the FAA’s Civil Aviation Medicine Institute to its Basic Aviation Medical Examiner Course.

1. Clues that may be available before the examination begins:
   - You may know something of the reputation of the applicant in the community.
   - You may learn something from the applicant’s interaction with your office staff.
     Applicants with mental health problems may behave differently with office staff than with the examiner. Consider this if your staff points out behavioural problems or eccentricities.

2. Clues on Medical Certification form:
   - The applicant’s form contains careless or missing marks.
     Obtain the correct or missing data and ask why the mistake was made.
   - The class of certificate desired is not usual for this type of pilot.
     Find out how flying fits into the applicant’s lifestyle and plans.
   - The applicant does not live or work locally.
     Consider the type and stability of the applicant’s occupation.
     Discuss how the applicant came to pick you to do this examination.
   - Previous examinations were not completed.
     Was the applicant learning what to say or not say in order to pass?
   - Previous problems prevented certification (medical or mental health history).
   - Previous experience with health professionals was not adequately explained.
   - Pilot has had personal counselling by mental health professionals or paraprofessionals.
   - Pilot time is unusual or contains unexplained gaps.
     Ask for explanation from a high-time pilot with no date of last examination.
   - Medication history suggests significant illnesses that pilot did not note on the history questionnaire.
     Obtain an adequate history.
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

- Explanations for any medical history or findings do not make sense or seem illogical.

  *Remember Jones’s Rule of Irrational Data:* If you don’t understand what a flier means, assume it’s your problem. Ask again, clearly. If the flier tries hard to explain, you try hard to understand, and you still don’t understand, it’s probably the flier’s problem. Find out what it is. Possibilities include simple misunderstandings, English as a second language, educational deficiencies, cultural differences, limited intelligence, neurological problems, or psychiatric problems.

3. **Clues obtained during the physical examination:**

- Note anything markedly different from what you usually see in pilots: trust your instincts.

- Assess the nature of the applicant’s motivation to fly (Jones, 1986). Err on the side of caution.

  *Watch for applicants who want to be fliers rather than who want to fly.* Some see themselves as alienated from others, or inept, or weak, and wish to acquire the attributes they perceive to be those of fliers: gregarious, competent, and strong.

  *Watch for applicants who want to fly in order to prove fearlessness.*

- Look for scars without explanation obtained by history. Palpate scalp and skull for evidence of old head injury.

  *Watch for applicants whose collection of scars reflects personal recklessness.*

- Watch for applicants who are evasive about surgical scars or head injury scars. Ask about significant loss of consciousness or amnesia if pilot did not report the injury on the 8500-8.

- Observe other pertinent physical factors bearing on mental status (e.g., dress, grooming conduct, alcohol on breath, needle tracks, tattoos that suggest sociopathy, slash scars on wrists, spider nevi, hepatomegaly, blood pressure, heart rate, pupils).

- Talk with applicants before, during, and after the physical examination—inquire about home, work, education, military, or flying. Trust your judgment if you feel uneasy.
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

- Inquire about non-prescription medications, herbal remedies and dietary supplements.

  Such information may be aeromedically significant because of the nature of these remedies, or because of the symptoms for which the pilot feels they are necessary. Taking St. John’s Wort may indicate the presence of depressive symptoms, for instance.

4. What to do when you have finished:

- Ask enough questions to clarify troublesome issues.
- Obtain indicated medical data.
- If anything you encounter raises clinical questions about the applicant’s mental status, or even if you find yourself feeling uncomfortable without knowing exactly why, perform a brief mental status evaluation, using some or all of the items in the Formal Mental Status Examination (MSE) that follows.

  Note that some clinical MSEs, such as the Mini-Mental Status Examination, assess only the Sensorium rather than the entire mental status of a person.

- If you find anything that indicates clinical problems, consider necessary specialty consultations. Again, trust your judgment as an examiner, even if you can’t exactly define what’s wrong.
- Mention equivocal items in "Comments" section of Original or Renewal form for the record, even if you grant the certificate. Your data will be on record if the item arises in future examinations.
- If in doubt, call CASA AVMED for advice.
- If in serious doubt, defer; let CASA decide.
- As a last resort: make a “Don’t quote me” call to the medical authority.
AMSIT (Appearance, Mood, Sensorium, Intelligence, Thought) is adapted from a formulation by David Fuller, MD, as presented in R.L. Leon, MD. Psychiatric Interviewing: A Primer. Ed 2, New York; Elsevier/Science Publishing Co. 1989.

**Appearance, Behaviour, and Speech**

- **Physical Appearance**: apparent age, sex, and other identifying features. Appearance of being physically ill or in distress; and a careful description of the patient’s dress and behaviour.
- **Manner of Relating to Examiner**: placating, negativistic, seductive; motivation to work with examiner.
- **Psychomotor Activity**: increased or decreased, including jumpiness, jiggling, tapping, looking at watch, etc. Is the person hyperactive or lethargic?
- **Behavioural Evidence of Emotion**: tremulousness, perspiration, tears, clinched fist, turned-down mouth wrinkled brow, etc.
- **Disturbance of Attention**: distractibility, self-absorption.
- **Speech**: description—volume, rate (pressured or slowed), clarity, spontaneity and disturbances—mutism, word salad, perseveration, echolalia, affectation, neologisms, clang speech.

**Mood and Affect**

*Note*: “Mood is to Affect as Climate is to Weather.”

- **Mood**: use adjectives: *mild* (it’s there), *moderate* (it needs treatment), or *severe* (it needs treatment today!). Consider depression, elation, or other sustained emotions such as anger, fear, or anxiety.
- **Affect**: its range, intensity, lability, and appropriateness to immediate thought. To describe a normal, stable emotional status, say something like “The examinee’s mood is euthymic. Affect is unremarkable in range, intensity, and stability, and is appropriate to material being discussed.”

**Sensorium**

- **Orientation**: for time, place and situation.
- **Memory**: *immediate* (digits recall), *recent* (three items for 10 minutes, current events) and *remote* (history).
Formal Mental Status Examination

- **Calculating Ability**: serial 7’s, 11 times 13 out loud (valid only if patient is adequately educated).

- **Concentration**: spell *WORLD* backwards, then arrange its letters alphabetically. Repeat with *EARTH*.

**Intellectual Function**

Estimate current level of function as *above average*, *average*, or *below average* based on general fund of information, vocabulary, and complexity of concepts. Do not confuse *intelligence* with *education*. Can the examinee handle abstract ideas, reason by analogy, “make the connection” in conversation? Is the examinee about as smart as the examiner?

**Thought**

- **Coherence**: clear thoughts may be expressed incoherently.

- **Logic**: even clear, grammatical speech may express illogical thoughts.

- **Goal Directedness** (has a point and makes it): tangential or circumstantial thought.

- **Disturbance of Attention**: distractibility (interrupts own sentences), self-absorption.

- **Associations**: loose associations, blocking of obvious ideas or connections, flight of ideas.

- **Perceptions**: hallucinations (false perceptions), illusions, depersonalisation, distortion of body image.

- **Delusions**: false interpretations of real situations.

- **Other Content**: noteworthy memories, thoughts and feelings; suicidal or homicidal intent.

- **Judgement**: formal (specific set-piece situations such as “mailing a letter you find on the street”), social (how examinee behaves with examiner, how he or she “reads” other people—predictable, reasonable, comfortable).

- **Abstracting Ability**: ask pilot to define similarities/differences between *tree-bush, child-midget, king-president, character-personality*. This is more reliable than interpreting proverbs (*stitch in time, bird in the hand*).

- **Insight**: understanding of any personal dysfunction affecting self or others, and its need for treatment. Insight is *lacking* if there is an unacknowledged problem, *superficial* if it is only acknowledged (“It is a problem.”), *moderate* if it is personalized (“I have a problem”), and *profound* if “It’s my problem, and it’s up to me to fix it.”
Criteria for the Diagnosis of Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD)

Before a diagnosis of ADD/ADHD can be made, the following criteria (from DSM IV) must be fulfilled:

A. Either (1) or (2):

1. Six (or more) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
   - Often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
   - Often has difficulty sustaining attention in tasks or play activities
   - Often does not seem to listen when spoken to directly
   - Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
   - Often has difficulty organizing tasks and activities
   - Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
   - Often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
   - Is often easily distracted by extraneous stimuli
   - Is often forgetful in daily activities.

2. Six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
   - Hyperactivity
     - Often fidgets with hands or feet or squirms in seat
     - Often leaves seat in classroom or in other situations in which remaining seated is expected
     - Often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
     - Often has difficulty playing or engaging in leisure activities quietly
     - Is often "on the go" or often acts as if "driven by a motor" often talks excessively
   - Impulsivity
     - Often blurts out answers before questions have been completed
     - Often has difficulty awaiting turn
     - Often interrupts or intrudes on others (e.g. butts into conversations or games)
Criteria for the Diagnosis of Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g. at school [or work] and at home).

D. Clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g. Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

Specify Types:

- **Attention-Deficit/Hyperactivity Disorder, Combined Type**: if both Criteria A1 and A2 are met for the past 6 months.

- **Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type**: if Criterion A1 is met but Criterion A2 is not met for the past 6 months.

- **Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type**: if Criterion A2 is met but Criterion A1 is not met for the past 6 months.
**Revision History**

*Note:* The Revision History shows the most recent amendment first. Scroll down the table to view details of previous amendment information.

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### Application for Appointment or Re-appointment as
### Designated Aviation Medical Examiner or
### Designated Aviation Ophthalmologist

(Under Regulation 6.02 of the Civil Aviation Regulations)

Forward completed form and signed declaration to the Director of Aviation Medicine, GPO Box 1544, Canberra City, ACT 2601, Fax 02 62171640, e-mail avmed@casa.gov.au.

#### Tick as appropriate

- [ ] Designated Aviation Medical Examiner
  - (Sign Declaration at page 3)
- [ ] Designated Aviation Ophthalmologist
  - (Sign Declaration at page 5)

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The Federal Government TimeSaver initiative aims to assess the time taken to complete Government Forms. Please indicate the approximate time taken to complete this form. [ ] Hrs [ ] Mins
CONDITIONS OF APPOINTMENT

CASA DESIGNATED AVIATION MEDICAL EXAMINER (DAME)

1. Designation is for a period of four years unless earlier terminated, and is renewable.
2. Designation lapses if the aviation medical examiner ceases to practise in the locality for which he/she is designated.
3. Designation does not extend to the DAME’s partners, assistants or locums unless written consent from the CASA Director of Aviation Medicine/Principal Medical Officer is obtained in advance of the requirement.
4. The DAME is required:

   i. to conduct himself/herself in a professional manner and in accordance with the Australian Medical Association’s Code of Ethics (details of which are available from the Association’s web page www.ama.com.au);

   ii. to be satisfied as to the identity of each applicant;

   iii. to examine personally each application presenting for examination;

   iv. to devote such time and skill to the examination of applicants as is necessary to elicit a careful history and to conduct a full and thorough examination;

   v. at the conclusion of each medical examination to forward the report to CASA promptly;

   vi. if the holder of a medical certificate tells a DAME about a medical condition that is relevant to aviation safety, the DAME must inform CASA of the condition within 5 working days;

   vii. to keep informed of, and follow the relevant standards, techniques and administrative procedures associated with medical examinations detailed in The DAME Handbook and in the DAME Newsletter published by CASA on its website;

   viii. to undertake continuing training, acceptable to CASA, in Aviation Medicine;

   ix. to notify CASA if absent from active practice for more than 4 weeks;

   x. to notify CASA of any change of address, of contact details, or of cessation of practice;

   xi. on cessation of appointment as a DAME, to return the DAME stamp and to destroy or return any unused examination forms to CASA;

   xii. to acknowledge CASA’s right to terminate Designation should the DAME conduct himself/herself in a manner that is detrimental to the interests of CASA or breach any of these Conditions of Appointment;

   xiii. (Australian applicants only) to effect and maintain membership of the Australasian Society of Aviation Medicine (ASAM) or other approved aviation medical/scientific organization;

   xiv. to authorise CASA to publish in the DAME Newsletter and the CASA website the DAME’s cessation of practice, resignation of appointment as a DAME or termination of appointment as a DAME by CASA;
xv. to authorise the regulatory authority of any ICAO Contracting State that designated or designates the DAME to disclose to CASA information about the DAME’s performance and competence as a medical examiner; and

xvi. to authorise CASA to disclose to the regulatory authority of another ICAO Contracting State that designates medical examiners for that State that has designated the DAME or to which the DAME has applied to be designated, information about the DAME’s performance as a medical examiner.

5. The DAME is required to provide the following facilities and equipment:

i. a suitable examination room and general diagnostic equipment, including an accurate sphygmomanometer;

ii. simple urine testing facilities;

iii. Ishihara pseudoisochromatic chart (24 plate) for colour vision testing;

iv. visual acuity charts(s) for use at 6 metres;

v. N series test types for near vision testing;

vi. ophthalmoscope;

vii. a height measuring scale (cm);

viii. weighing scales (kg);

ix. an electrocardiograph machine which complies with the Australian Standard, or a reliable local source for obtaining ECGs when required. (A specimen tracing on a normal subject from this machine may be required); and

x. a suitable computer, document scanner, modem and software package for communication with CASA. (Details will be notified from time to time).

Declaration by Applicant

I have read the Conditions of Appointment (‘the Conditions’) set out above and, if designated, I agree to accept the Conditions. Upon my designation, this declaration shall constitute my acknowledgment for the purposes of subparagraph 4 (xii) and respective authorisation for purposes of subparagraphs 4 (xv) and (xvi) of the Conditions.

Applicant’s Signature Date ....................................../ ................../ ......

Name.................................................................................. (Please use Block Capitals)
CONDITIONS OF APPOINTMENT

CASA DESIGNATED AVIATION OPHTHALMOLOGIST (DAO)

1. Designation is for a period of four years unless earlier terminated, and is renewable.
2. Designation lapses if the aviation medical examiner ceases to practise in the locality for which he/she is designated.
3. Designation does not extend to the DAO’s partners, assistants or locums unless written consent from the CASA Director of Aviation Medicine/Principal Medical Officer is obtained in advance of the requirement.
4. The DAO is required:
   i. to conduct himself/herself in a professional manner and in accordance with the Australian Medical Association’s Code of Ethics (details of which are available from the Association’s web page www.ama.com.au);
   ii. to be satisfied as to the identity of each applicant;
   iii. to examine personally each application presenting for examination;
   iv. to devote such time and skill to the examination of applicants as is necessary to elicit a careful history and to conduct a full and thorough ophthalmic examination;
   v. at the conclusion of each medical examination to forward the report to CASA promptly;
   vi. to keep informed of, and follow the relevant standards, techniques and administrative procedures associated with ophthalmological examinations detailed in The DAME Handbook and in the DAME Newsletter published by CASA on its website;
   vii. to notify CASA if absent from active practice for more than 4 weeks;
   viii. to notify CASA of any change of address, of contact details, or of cessation of practice;
   ix. on cessation of appointment as a DAO, to return the DAO stamp and to destroy or return any unused examination forms to CASA;
   x. to acknowledge CASA’s right to terminate Designation should the DAO conduct himself/herself in a manner that is detrimental to the interests of CASA or breach any of these Conditions of Appointment;
   xi. (Australian applicants only) to effect and maintain membership of the Australasian Society of Aviation Medicine (ASAM) or other approved aviation medical/scientific organization;
   xii. to authorise CASA to publish in the DAME Newsletter and the CASA website the DAO’s cessation of practice, resignation of appointment as a DAO or termination of appointment as a DAO by CASA;
   xiii. to authorise the regulatory authority of any ICAO Contracting State that designated or designates the DAO to disclose to CASA information about the DAO’s performance and competence as a medical examiner; and
xiv. to authorise CASA to disclose to the regulatory authority of another ICAO Contracting State that designates medical examiners for that State that has designated the DAO or to which the DAO has applied to be designated, information about the DAO’s performance as an ophthalmologist examiner.

Declaration by Applicant

I have read the Conditions of Appointment (‘the Conditions’) set out above and, if designated, I agree to accept the Conditions. Upon my designation, this declaration shall constitute my acknowledgment for the purposes of subparagraph 4 (x) and respective authorisation for purposes of subparagraphs 4 (xiii) and (xiv) of the Conditions.

Applicant’s Signature

Date

Name

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# Designated Aviation Medical Examiner's Handbook
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Approved by Assistant Director, Aviation Safety Standards  
Version 3.3: July 2005

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1.1.1 Abbreviations Used in this Handbook.

ARN  Aviation Reference Number
AMSANZ  Aviation Medical Society of Australia and New Zealand
ASAM  Australasian Society of Aerospace Medicine
AsMA  Aerospace Medicine Association
ATPL  Airline Transport Pilot Licence
CAA  Civil Aviation Act
CAR  Civil Aviation Regulations
CASR  Civil Aviation Safety Regulations
CASA  Civil Aviation Safety Authority (Australia)
DAEE  Designated Aviation Eye Examiner
DAME  Designated Aviation Medical Examiner
DAO  Designated Aviation Ophthalmologist
FAA  Federal Aviation Administration (US)
IAASM  International Academy of Aviation and Space Medicine
ICAO  International Civil Aviation Organization
JAA  Joint Aviation Authorities (Europe)
MRS Online  Medical Records System Online
PMO  Principal Medical Officer

1.1.2 The Origin and Development of the CASA DAME Handbook

CASA and its antecedent organizations have published advice for DAMEs concerning practical and administrative aspects of their duties for many years. The most comprehensive and semi-permanent repository of such advice has been CASA’s DAME Handbook, which originated in the late 1980s. The original hard copy publication was an amalgam of advice derived from many sources. Some of the material can be traced back to directives produced by the Aviation Medicine Branch within the Australian Department of Civil Aviation during the 1950s. A considerable debt is due also to earlier published advice from other Regulators, particularly CAA (New Zealand) and the US FAA.

The DAME Handbook was never intended to be completely prescriptive or authoritative, particularly in its more clinically oriented sections. The principal purpose of creating (and maintaining) such a publication is to provide a compact ready reference for DAMEs and anyone else in CASA’s procedures related to aeromedical certification. Soon after The DAME Handbook was first published, a need for further explanation and elaboration of its contents became obvious, leading to creation of periodic DAME Newsletters issued by the Director of Aviation Medicine. Jointly, these publications aspired to answer DAMEs’ FAQs and to provide guidance that would reduce errors and facilitate expeditious handling of the medical examinations and reports concerning applicants prepared for CASA.
By 1998, *The DAME Handbook* was showing distinct signs of nearing the end of its useful life. Parts of the *Handbook* had been so qualified and specifically interpreted that it was sometimes difficult for DAMEs and even for staff of CASA Aviation Medicine Section to understand all requirements. Thereafter, an interim revision was produced to remove the more glaring inconsistencies and contradictions that existed between it and some DAME Newsletters. At the same time, CASA had determined that all its future public documents should be created and maintained in electronic format, available on-line, rather than as hard copy. This decision had other major implications, particularly the accessibility of all such documents to unrestricted public scrutiny.

The first on-line version of *The DAME Handbook* was posted on CASA’s website in May 1999. It represented only an interim answer to a continuing need to provide succinct, accessible, relevant advice to DAMEs and other interested persons. At that stage, much of its contents still derived from the reverence accorded to our authoritative forebears, who had not been constrained to reach decisions on evidence-based medicine principles. At least the style was brought into line with modern CASA standards.

The next priority was to review the contents of the system-based chapters in Section 2. This task has continued ever since. CASA intends that this process will continue indefinitely, to ensure relevance and currency of guidance provided. CASA is committed to procedural transparency and to meeting best-practice standards in all of its activities. Aviation Medicine Section’s accelerating, continuous review of *The DAME Handbook* reflects that commitment and will result in the availability of a better, cross-referenced and more practically useful guide.

### 1.1.3 Appointment and Legal Status of Designated Aviation Medical Examiners (Target Audience of the Handbook)

In order to utilise a Flight Crew Licence or Air Traffic Service Licence, it is necessary to have a medical clearance at a standard appropriate to the licence held. Within Australia, designated medical practitioners perform the necessary medical examinations for the Aviation Medicine Section of the Civil Aviation Safety Authority.

Designated medical practitioners perform medical examinations to meet the provisions of the Civil Aviation Act, the Civil Aviation Regulations and the Civil Aviation Safety Regulations. The practitioners approved to perform these examinations are known as Designated Aviation Medical Examiners (DAMEs) or Designated Aviation Ophthalmologists (DAOs). They are responsible to the Principal Medical Officer, who oversees the administration of the DAME and DAO systems.

In order to meet CASA’s needs and the needs of applicants for medical certification, appropriately qualified holders of certain positions are also permitted to undertake the duties of DAMEs and DAOs.
In order to meet CASA’s needs and the needs of applicants who are distant from regular examiners for medical certification, appropriately qualified individual practitioners may also be permitted, as needed, to undertake the duties of DAMEs and DAOs.

Certain optometrists are also approved to perform all those examinations usually carried out by DAOs. These practitioners are known as Designated Aviation Eye Examiners (DAEEs).

To request appointment or reappointment as a DAME, DAO or DAEE, complete a CASA application form (Form 755). Intending applicants may wish first to obtain additional information from one of CASA’s DAME Liaison Officers.

1.1.4 Qualifications and Experience

1. Medical practitioners designated by CASA to perform Air Crew and Air Traffic Services medical examinations must be registered with the medical registration authority of the State or Territory of the Commonwealth or country in which they reside.

2. As a signatory to the Chicago Convention, Australia is bound to appoint as DAMEs only medical examiners that have had appropriate training in aviation medicine. Possession of the Australian Certificate in Civil Aviation Medicine or similar qualification is the normal minimum requirement for appointment as a DAME. A list of courses that CASA will routinely approve for this purpose is available on the CASA website. Applicants for appointment as DAMEs on the basis of completion of other courses should contact CASA’s DAME Liaison Officers to discuss requirements.

Prior to appointment, and periodically thereafter, DAMEs are required to give an undertaking to abide by specified conditions of appointment. This is contained in Form 755.

3. DAMEs are required to attend periodic training seminars or courses in aviation medicine approved by CASA. Routinely approved seminars or courses will be posted on the CASA website. Attendance at an aerospace medicine scientific meeting such as those conducted by ASAM (formerly AMSANZ), AsMA, IAASM, FAA, CASA or similar bodies is sufficient to meet this requirement. DAMEs may also apply individually for approval of other appropriate training activities. Documented attendance at an appropriate activity is usually required at least once every two years.

Because DAOs and DAEEs examine and report only on applicants’ vision, they are encouraged but not required to undertake appropriate training in aviation medicine. However, these practitioners are required to undertake continuing professional education approved by CASA. (CASA will accept evidence of completion of continuing professional education required by an appropriate professional college, association or registration authority as satisfying this requirement).
4. DAMEs resident in Australia are required to effect and maintain membership of the Aviation Medical Society of Australia and New Zealand/the Australasian Society of Aerospace Medicine.

5. DAOs and DAEEs resident in Australia are required to effect and maintain membership/associate membership, as appropriate, of the Aviation Medical Society of Australia and New Zealand/the Australasian Society of Aerospace Medicine.

6. All designated examiners should, as far as possible, be aware of the conditions in which applicants for medical certification are employed or operate. CASA encourages designated examiners to acquire practical experience of these conditions.

7. Designation is usually granted only to practitioners in full-time practice and for one address. Continued designation is subject to the terms set out in the application for appointment in Form 755.

1.1.5 Duration of Designation

CASA appoints DAMEs, DAOs and DAEEs for periods specified at the time of appointment. They are required to re-apply for appointment at the end of each such period.

Designation lapses if the designated examiner ceases to practise at the location for which he/she is appointed, unless CASA approves a changed practice location.

Designation lapses if the designated examiner fails to observe the relevant conditions of appointment as set out in Form 755.

Designation does not automatically extend to a designated examiner’s partners, assistants, locums or successors without prior CASA approval, which should be sought well in advance of any anticipated need. Designated examiners who wish to have other practitioners act in their stead should contact CASA to ascertain precise requirements. For DAMEs’ proposed locums, completion of an approved aviation medicine course is a prerequisite for approval. CASA does not usually approve locum appointments for periods of less than four weeks.
1.1.6 Duties and responsibilities of DAMEs

CASR 67.125 1. On becoming aware of any condition of potential aeromedical significance in the holder of or applicant for an aviation medical certificate, the DAME must notify CASA of full details within five working days. Note that certain minor conditions (see 1.4.5 Temporary Incapacity of Certificate Holders) need not be reported until the applicant’s next-following routine medical assessment. CASR 67.125 refers.

CASR 67.170 2. The DAME must be satisfied as to the identity of each applicant for medical certification. Unless the DAME personally knows the applicant, he/she must sight a photographic identity document of the applicant. Subsequently, the DAME is required to certify that he/she has formally identified each applicant. CASR 67.170 refers.

Note: It is prudent to remind applicants, when making appointments, of the need to bring photographic identification to their appointments.

3. The DAME is to answer the medical history questions in the medical assessment report, in conjunction with the applicant, and ensure that the applicant understands each such question.

4. The DAME is to examine personally each applicant presenting for examination, and record the results in the medical assessment report.

5. The DAME is to perform or arrange for any investigations or specialist assessments that are necessary for the examiner to be satisfied that the applicant meets the medical standard for the class of medical certificate sought. See Examiners With Farnsworth Lantern Testing Facilities on the CASA website.

6. The DAME is to comply with CASA’s directions concerning completion and lodgement of medical reports.

7. The DAME is to forward to CASA each medical report or ancillary report received concerning an applicant for medical certification. In usual circumstances, all such reports should be dispatched within 14 days of receipt unless the DAME has contacted CASA and a different schedule has been agreed.

8. The DAME is to ensure that the applicant signs the required statement on completion of the examination. Thereafter, the DAME is to complete his/her details on the statement, and forward it to CASA within the specified period. Under no circumstances should the statement be given to the applicant to dispatch to CASA.
9. The DAME is to maintain an up-to-date knowledge of the relevant civil aviation medical standards and techniques required by CASA and by ICAO, and also interpret these requirements for applicants for medical certification. In particular, the DAME is to acknowledge promptly advice from CASA on publication of DAME Newsletters or of changes to the DAME Handbook.

10. The DAME is to notify CASA promptly of any change of address, change of e-mail address, change of telephone number, or absence from practice for periods of four weeks or more.

11. The DAME is to display his/her certificate of appointment as a DAME in his or her professional rooms.

12. The DAME is to return his/her official stamp to CASA on cessation of appointment.

13. The DAME is to use his/her official stamp only for CASA-related purposes. In particular, it should not be used as a means of certifying completion of any medical examinations not required by CASA.

14. CASA requests that DAMEs inform the Authority of details when they learn of the death of any medical certificate holder. (Although this is not a requirement of appointment, such notice is useful for CASA’s monitoring of the health of Australia’s aviation workforce.)

1.1.7 Duties and Responsibilities of DAOs and DAEEs

1. On becoming aware of any condition of potential aeromedical significance in the holder of or applicant for an aviation medical certificate, the DAO or DAEE must notify CASA of full details within five working days. Note that certain minor conditions need not be reported until the applicant’s next-following routine medical assessment (see 1.4.5 Temporary Incapacity of Certificate Holders). CASR 67.125 refers.

2. The DAO or DAEE must be satisfied as to the identity of each applicant for medical certification. Unless the DAME or DAEE personally knows the applicant, he/she must sight a photographic identity document of the applicant. Subsequently, the DAO or DAEE is required to certify that he/she has formally identified each applicant. CASR 67.170 refers.

Note: It is prudent to remind applicants, when making appointments, of the need to bring photographic identification to their appointments

3. The DAO or DAEE is to examine personally each applicant presenting for examination, and record the results in the eye examination report.
4. The DAO or DAEE is to comply with CASA’s directions concerning completion and lodgement of eye examination reports. See *Examiners With Farnsworth Lantern Testing Facilities* on the CASA website.

5. The DAO or DAEE is to ensure that the applicant signs the required statement on completion of the examination, enter his/her details on the statement, and forward it to CASA within the period specified.

6. The DAO or DAEE is to maintain an up-to-date knowledge of the relevant civil aviation medical standards and techniques required by CASA and by ICAO, and also interpret these requirements for applicants for medical certification. In particular, the DAO or DAEE is to acknowledge promptly advice from CASA on publication of DAME Newsletters or of changes to the DAME Handbook.

7. The DAO or DAEE is to notify CASA promptly of any change of address, change of e-mail address, change of telephone number, or absence from practice for periods of four weeks or more.

8. The DAO or DAEE is required to display his/her certificate of appointment as a DAO or DAEE in his or her professional rooms.

9. The DAO or DAEE is to return his/her official stamp to CASA on cessation of appointment.

10. The DAO or DAEE is to use his/her official stamp for CASA-related purposes only.

### 1.1.8 Facilities and Equipment

DAMEs are required to provide the facilities and equipment as set out in Form 755 under *Conditions of Appointment of DAMEs* – paragraph 5.

DAOs and DAEEs are required to provide appropriate facilities and equipment for eye examinations as required by CASA.

### 1.1.9 Powers under the Civil Aviation Regulations

The Civil Aviation Safety Regulations confer the following powers on DAMEs:

- Extension of the period in force of a current medical certificate, unless it bears the condition ‘Renew by CASA only’. Refer CASR 67.210.
Designated Aviation Medical Examiner’s Handbook

1. Administrative Aspects

1.1 Introduction

Approved by Assistant Director, Aviation Safety Standards  Version 3.0: December 2003

**CASR 67.225**
- Renewal of the validity of a medical certificate that expired within three months of the examination, unless it bears the condition ‘Renew by CASA only’. Refer CASR 67.225.

**CASR 67.225(3)**
- Direction of an applicant for medical certification to provide or to authorise release by other parties of any information necessary to determine whether the applicant meets the required medical standard for certification. Refer CASR 67.225(3)

**CASR 67.235(2)**
- Certification of continuing fitness for duty of pregnant air traffic control staff during late pregnancy. Refer CASR 67.235(2).

**CASR 67.265(4), 67.270(3)**
- Certification of return of fitness to exercise privileges of a licence in a medical certificate holder who has been affected by a medically significant condition for a prescribed period. Refer CASR 67.265(4) and CASR 67.270(3)

1.1.10 Responsibilities Under the Civil Aviation Regulations

The Civil Aviation Safety Regulations confer the following responsibilities on DAMEs:
- To comply with any applicable requirements contained in the **DAME Handbook**
- To observe of the **Code of Ethics** of the Australian Medical Association
- To attend appropriate continuing education activities relevant to their aviation medicine practice
- To report to CASA within five working days any safety-relevant condition detected in an applicant
- To complete and promptly forward to CASA a Notice/Declaration/Consent/Authorisation: Medical Certification of Applicants form in respect of each applicant examined. Note that part of this process requires the DAME to certify the identity of the applicant.

Further details appear in CASRs 67.060 and 67.170.

The Civil Aviation Safety Regulations confer the following responsibilities on DAOs and DAEEs:
- To comply with any applicable requirements contained in the **DAME Handbook**.
- To observe of the **Code of Ethics** of the Australian Medical Association or the Optometrists’ Association Australia, as appropriate.
- To report to CASA within 5 working days any safety-relevant condition detected in an applicant.
Further details appear in CASRs 67.080 and 67.170.

When CASA (or a DAME, DAO or DAEE) refers an applicant to a specified medical specialist of its / the referring practitioner’s choice for investigation and / or report, CASA expects that the medical specialist concerned will observe an appropriate, ethical level of professional impartiality. Supreme Court of the ACT Practice Direction No 3 of 2002 (and similar court directives issued in other Australian jurisdictions) provides relevant guidance. If in doubt as to requirements, referring professionals are invited to contact CASA Aviation Medicine Section to discuss the matter.

### 1.1.11 Protection Under the Civil Aviation Regulations

Civil Aviation Safety Regulations provide complete indemnification against civil or criminal liability for any medical practitioner or other nominated person or organisation that, in good faith, performs an indemnified act in accordance with the Regulations. Refer CASR 67.140.

For this purpose, ‘an indemnified act’ means any act whereby a DAME, other medical practitioner or other specified person (including a DAEE) advises CASA of any concerns over the ability of a medical certificate holder or applicant to meet a required medical standard for such certification. CASA requires such advice to be provided in writing.

### 1.1.12 Fees

CASA does not set or recommend fees for general DAME, DAO or DAEE examinations.

In the case of CASA employees who are required to hold aviation licences to perform their duties and are thus entitled to reimbursement from CASA for the cost of examinations and any related tests, CASA will reimburse fees determined as reasonable by the CASA PMO. In general, CASA will accept as reasonable, fees that closely approximate the fees recommended in the current edition of the *AMA List of Medical Services & Fees*. Any additional amounts will be the responsibility of the examinee. In cases of doubt or unusual complexity, examiners are invited to discuss the matter with the CASA PMO. Note that CASA will not accept responsibility for any treatment expenses incurred by its employees arising from findings in the course of routine assessments for medical certification.

When presenting for assessment, CASA employees should either present a CASA claim for payment form, with details of where to send it to obtain payment, or personally pay for the consultation and claim reimbursement from CASA. Examiners should not send accounts to Aviation Medicine Section unless this has been previously agreed as the result of a specific request from Aviation Medicine Section.
Where a DAME has been required to expend additional time and effort for a CASA employee in arranging specialist referrals or investigations, obtaining and interpreting copies of reports, or on similar activities, an approach to the CASA PMO for a higher-than-normal fee may be considered.

**Additional Examinations**

Where additional consultations or investigations are necessary to ascertain if an applicant for medical certification meets the required medical standard, the applicant is usually responsible for meeting any costs involved. If such tests are undertaken principally for screening purposes, they will not generally be eligible for rebate from the Health Insurance Commission (HIC). However, if additional tests are required to elucidate a health problem for which medical opinion, investigation or treatment is clinically necessary, these should be rebatable. Affected applicants should be advised to discuss their individual cases with the HIC.

In the case of CASA employees who are required to hold aviation licences to perform their duties and are thus entitled to reimbursement from CASA for the cost of examinations and any related tests, CASA will reimburse fees determined as reasonable by the CASA PMO for additional consultations or investigations necessary to ascertain if the employee meets the required medical standard. In general, CASA will accept as reasonable, fees that closely approximate the fees recommended in the current edition of the *AMA List of Medical Services & Fees*. Any additional amounts will be the responsibility of the examinee. Note that CASA will not accept responsibility for any treatment expenses incurred by its employees arising from findings in the course of routine assessments for medical certification.
1.2.1 Licences – General

Aircrew and air traffic services licences are issued to applicants who have met the relevant technical and theoretical standards. Once a licence is issued, it continues in effect indefinitely. A valid medical certificate appropriate for the class of licence must accompany the licence for the licence holder legally to exercise the privileges of the licence.

1.2.2 Classes of Medical Certificates for Licence Types

There are three medical standards relating to the various types of licences held. These three standards relate to Class 1, 2 and 3 Medical Certificates.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Applicable to</th>
</tr>
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<tbody>
<tr>
<td>Class 1</td>
<td>All professional technical aircrew of powered aircraft, and is required for issue of Airline Transport Pilot Licence, Commercial Pilot Licence, Flight Engineer or Flight Navigator Licences.</td>
</tr>
<tr>
<td>Class 2</td>
<td>Student Pilot, Private Pilot, Commercial Pilot Balloons and Flight Radio Operator Licences.</td>
</tr>
<tr>
<td>Class 3</td>
<td>Air Traffic Control staff.</td>
</tr>
</tbody>
</table>

1.2.3 Duration of Validity

See 1.4.7 Special Periodic Examinations Required.

Unless otherwise advised by the Aviation Medicine Section:

- **Class 1**: Medical Certificate is valid for one year (but see 1.4.7 Special Periodic Examinations Required).
- **Class 2**: Medical Certificate is valid for four years, for applicants less than 40 years of age on the day of issue, and in all other cases for two years.
- **Class 3**: Medical Certificate is valid for two years.

Where an applicant’s medical condition is under review, the duration of Medical Certificate validity may be varied at the discretion of the Principal Medical Officer.
### 1.2.4 Special Reports and Tests Required for Medical Certification

<table>
<thead>
<tr>
<th>Class 1</th>
<th>Initial Issue</th>
<th>ECG, audiogram, estimation of fasting serum lipids and fasting blood glucose and an examination by CASA Designated Aviation Ophthalmologist.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Renewals</td>
<td>ECGs are required at the first renewal after the 25th, 30th, 32nd, 34th, 36th, 38th and 40th birthdays, and annually thereafter. Audiograms are required at the first renewal after the 25th birthday and every fifth birthday thereafter. Estimation of fasting serum lipids and of fasting blood glucose is required at the first renewal after the 25th birthday and every fifth birthday thereafter. Examination by CASA Designated Aviation Ophthalmologist at age 60 and at two-yearly intervals thereafter.</td>
</tr>
</tbody>
</table>

| Class 2 | Where an applicant for original medical certification has a visual acuity < 6/60 in either eye, an ophthalmic report from an ophthalmologist or optometrist (preferably a DAO or DAEE) is required. There are no other special requirements, except where an examiner determines a clinical indication exists. |

<table>
<thead>
<tr>
<th>Class 3</th>
<th>Initial Issue</th>
<th>ECG, audiogram, estimation of fasting serum lipids and fasting blood glucose and an examination by CASA Designated Aviation Ophthalmologist.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Renewals</td>
<td>ECGs are required at the first renewal after the 25th and 30th birthdays and every two years thereafter, ie, at every subsequent routine examination. Audiograms are required at the first renewal after the 25th birthday and then at each renewal after every fifth successive birthday. Estimation of fasting serum lipids and of fasting blood glucose is required at the first renewal after the 25th birthday and then at each renewal after every fifth successive birthday. Examination by CASA Designated Aviation Ophthalmologist at age 60 and at two-yearly intervals thereafter.</td>
</tr>
</tbody>
</table>

See also section 1.4.1 Electrocardiographs.
1.3.1 General Matters

From 2003, CASA has adopted a medical assessing system intended to automate the process of medical certification to the greatest extent practicable. The technological platform for this process is a computer-based system known as the CASA Medical Records System Online (MRS Online). Intended future development of MRS Online will further improve the speed and accuracy of medical certification.

Once MRS Online became fully operational, CASA decommissioned the former paper-based medical reporting system, which relied on optical scanning to capture and store data from routine medical assessments. CASA no longer maintains a capability to process paper-based routine reports of medical assessments. Consequently, any paper-based medical examination and report forms received are returned to the originator and a notice sent to the examinee advising him/her that the medical report has not been processed and that another is required. Note that further exercise of licence privileges is not permitted until medical certification via MRS Online is complete.

Pending further development of MRS Online, hard copies of applicant statement and examiner certification forms are still required.

CASA continues to accept hard copies of other medical reports, particularly ECGs, because of the time taken to transmit such documents electronically from some computer servers. However, CASA’s preference is for such documents to be scanned and transmitted electronically as attachments to the medical assessment form. In the near future, this will become the only available means for their lodgement.

If, for any reason, an examiner is unable to transmit a medical assessment form to CASA electronically, it is temporarily possible for an examination form to be mailed to the examiner on diskette. Once completed, the diskette can be returned and CASA can then load it manually into MRS Online. CASA does not intend to support this option in the long term because it vitiates many of the efficiency benefits available from MRS Online.

1.3.2 Medical and Ophthalmological Assessment Forms

Prior to undertaking any aeromedical examination, the examiner is to inform each applicant of the possible legal consequences of a deliberate false statement made with the intention of obtaining a medical certificate (see CASR 67). Thereafter, the examiner should obtain the applicant’s signature and complete the applicant statement and examiner certification form and record all relevant historical details obtained from the applicant.
CASA requires that the DAME personally ask the applicant the questions in the medical history section of the medical assessment report, then personally record the answers given. This allows the DAME to assess the applicant’s understanding of the questions and to provide any necessary explanations.

CASA similarly requires that the DAO/DAEE personally ask the applicant the questions in the medical history section of the eye assessment report, and personally record the answers given. This allows the DAO/DAEE to assess the applicant’s understanding of the questions and to provide any necessary explanations.

Slightly different historical data are required from applicants for original medical certification, where fuller details are sought, and from applicants for renewal medical certification. MRS Online automatically generates the appropriate questionnaire for each examination on the basis of its own records and/or input data.

MRS Online automatically generates an original medical history questionnaire whenever a period of 5 years or longer has passed since the applicant’s last medical assessment report.

Where the holder of an existing class 2 medical certificate applies for medical certification at class 1 or 3 level, MRS Online will automatically generate an original medical history questionnaire.

### 1.3.3 The Medical Certificate

Civil Aviation Safety Regulations require an aviation licence holder to have a current, valid medical certificate appropriate to the class of licence held in order to validate the licence holder’s exercise of privileges conferred by the licence. That is, in order to exercise the privileges of an aviation licence, the licence holder must have both a licence and a valid medical certificate for the class of licence.

The medical certificate confirms that the applicant has been medically assessed, details the class of medical certificate held, the validity date, and confirms either that the required medical standard is met or details of any restrictions imposed by CASA which affect the medical certificate’s validity and therefore the use of the licence (refer 1.5.2 Frequently Used Conditions Endorsed on Medical Certificates). For professional licence holders, it also notes the dates of most recent additional examinations required (refer 1.4.6 Additional Investigations and Specialist Opinions).
DAMEs are not authorised to issue interim original medical certificates. Where permitted by Civil Aviation Safety Regulations (see CASR 67.220 and 67.225) they may revalidate an existing current medical certificate or one that has expired for less than three months (see following Section). Legally, every medical certificate is a new medical certificate. The ‘new’ medical certificates issued by DAMEs under provisions of CASR 67.225 actually refer to revalidated medical certificates that have expired for less than three months.
1.3.4 Medical Certificate Revalidation

DAMEs are not permitted to revalidate medical certificates endorsed ‘Renew by CASA only’. Affected applicants are encouraged to return to the DAME for early review, leaving adequate time for CASA to receive the periodic medical assessment and any other required reports and to make a determination on fitness for renewed medical certification.
On completion of the medical assessment, provided that the applicant appears to meet the required medical standard and provided the medical certificate has not been endorsed ‘Renew by CASA only’, the DAME may revalidate an applicant’s medical certificate only, as follows (refer CASR 67.220):

- If the applicant’s medical certificate has not expired and the assessment is conducted more than 28 days before the expiry date shown on the certificate—for up to two calendar months from the date of the assessment. (But see ‘Exception for ATPL recertification’ below).

- If the applicant’s medical certificate has not expired and the assessment is conducted within 28 days preceding the expiry date shown on the certificate—for up to two calendar months beyond the expiry date shown on the certificate.

- If the applicant’s medical certificate has expired, and the assessment is conducted within three calendar months of the expiry date shown on the certificate—for up to two calendar months from the date of the assessment.

To revalidate the medical certificate, the following endorsement is required:

‘Examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (the appropriate date to be inserted is determined according to instructions in the preceding paragraph):

DAME’s signature, date, DAME stamp.

Note: Any specialist assessments required in connection with a medical certificate renewal examination need not be performed within 28 days preceding the medical certificate’s expiry date. Guidance on CASA’s usual approach to currency of specialist reports and other investigations appears under 1.8 Frequently Asked Questions.

Exception for ATPL recertification.

Some CASA medical standards differ from those required by ICAO (refer Section 2.15). In particular, ATPL holders aged over 40 but under 60 may receive Australian class1 medical certification for 12 months, while ICAO countenances only six months. Because many of this group operate on international routes, CASA advises (and airlines require) that their medical certification is ICAO compliant.
1. Administrative Aspects

1.3 The Medical Assessing System

1.3.1 Administrative Aspects

1.3.2 The Medical Assessing System

Such applicants will often return for reassessment within the first 6 months of a medical certificate, which is valid for 12 months. In this circumstance, the DAME should endorse the applicant’s medical certificate as follows.

‘Re-examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (this will usually be the date 2 months after the assessment date)
signature, date, DAME stamp

Subsequently, in the usual course of events, CASA will issue a new class 1 medical certificate valid for a further 12 months from the date of assessment. Alternatively, CASA may issue a new medical certificate that has the effect of extending validity for six months longer than the current certificate’s expiry date. This situation will persist while ever the medical certificate holder operates as an ATPL in international air space.

Note: There are a number of other differences between CASA and ICAO medical standards. These particularly concern the periods of validity for medical certificates and the frequency of certain routinely required investigations or examinations. Full details likely to be of relevance to Australian examiners will be notified from time to time in DAME Newsletters. Those currently of interest are shown in section 2.15 of this manual. For practical purposes, only medical certificate holders who intend to exercise the privileges of licensure in other ICAO contracting states will be affected by these differences.

1.3.5 Assessments Other than Pass Assessments

Only CASA’s Principal Medical Officer (PMO) has the delegated power to cancel an applicant’s medical certificate(s).

Only CASA’s PMO and other CASA medical staff have the delegated power to suspend an applicant’s medical certificate(s).

A DAME may only revalidate the medical certificate of an applicant who appears to meet the required medical standard and where the medical certificate does not bear the endorsement ‘Renew by CASA only’. If a DAME has any concerns about an applicant meeting the required medical standard, he/she must decline to revalidate the medical certificate and refer the matter to CASA for determination. Relevant specialist opinions and/or investigations should be obtained and the results forwarded to CASA, together with the DAME’s opinion concerning the applicant’s fitness for certification.
To assist CASA’s consideration of applicants where there is doubt about ability to meet the required medical standard, DAMEs should avoid vague descriptive terms in their reports. Expressions such as ‘brief’, ‘infrequent’, ‘mild’, ‘some’ or similar convey no meaningful information. CASA recommends the “6W mnemonic”.

WHAT 1: What happened? (Detail signs and symptoms that led to the consultation, procedure performed etc).

WHAT 2: What were the sequelae?

WHEN: What were the dates and frequency?

WHERE: What body part was affected? (Left or right, upper arm/forearm etc).

WHY: Why was a procedure performed?

WHO: Who was involved? (Who carried out a procedure/made an assessment/is undertaking follow up, etc).

Once all necessary information has been received, CASA then submits full details of the case to a panel composed of aviation medicine practitioners. When appropriate, this panel may be supplemented by clinical or other specialists. A determination on the case will then be made and the applicant notified of the result.

If an applicant is dissatisfied with the panel’s determination, a review may be requested and/or the matter may be appealed to the Commonwealth Administrative Appeals Tribunal.

### 1.3.6 Identification of CASA Examiners (DAMEs, DAOs and DAEEs)

Each designated examiner (including approved locum examiners) requires an individual Aviation Reference Number (ARN), which must be obtained from CASA – refer Form1162.

CASA issues a unique identification stamp to each DAME. Each stamp carries a state or territory based code (‘A’ for ACT, ‘Q’ for Queensland etc, or ‘I’ for International) plus a three-digit number. Similarly, CASA issues a unique identification stamp to each DAO or DAEE. These also carry an alphanumeric code designating the state or territory plus a restriction limiting examinations to applicants’ eyes (‘SE’ for South Australia, ‘VE’ for Victoria, ‘IE’ for International, etc). Each stamp is intended for the exclusive use of the individual examiner to whom it is issued and, except as provided hereafter, must not be loaned to or used by any other practitioner without prior approval by the CASA PMO.

When CASA has approved a locum to act for a DAME, DAO or DAEE, the locum is to use the appropriate principal examiner’s stamp and also identify himself/herself as a locum in accordance with CASA procedures.
Locums

Locum approval must be obtained in writing from CASA prior to the dates requested. CASA requires a written request including the requested date, the contact details and signature of the proposed locum and the CV of the proposed locum. Once locum approval is gained in writing, the locum is able to perform aviation medical examinations and/or ophthalmological examinations using the existing stamp and writing 'locum’ next to the stamp within the requested dates.

Locums are viewed the same as DAMEs and DAOs in terms of indemnification, rights and responsibilities. Locums are required to abide by the Conditions of Appointment.

CASA also issues DAME stamps to occupants of certain identified positions who otherwise meet the requirements for appointment as DAMEs (refer CASR 67). These are senior medical positions in the Australian Defence Force (ADF) or Royal Flying Doctor Service (RFDS). Whenever an approved ADF or RFDS medical officer performs a medical assessment under the auspices of one of these identification stamps, details of the individual examiner are also required. Thus it is only possible for ADF or RFDS medical staff who have registered with CASA to perform medical assessments under the auspices of one of these stamps.

The DAME/DAO/DAEE stamp plus the examiner’s ARN must be inserted on all applicant consent and examiner certification forms before their dispatch to CASA, together with signatures of the applicant and of the examiner.

Examiners’ identification stamps should be stored securely when not in use. The unique identification number on each stamp should be used in all correspondence between the examiner and CASA.
1.4.1 Electrocardiographs

Routine electrocardiographs are required at specified intervals for class 1 and class 3 medical certification. They may also be required on clinical grounds (see Section 2.2).

All ECGs sent to CASA are to be mounted on A4 paper and must contain the following information.

- Applicant’s full name
- Applicant’s ARN
- Date of recording.

Leads should be marked on the trace and the calibration mark should be clearly visible. The tracing should be performed using standard calibration (10 mm/mV). If half calibration is needed to clarify the standard trace, both should be sent to CASA. ECGs with slurred or incorrect calibration are not acceptable.

When self-reporting ECG machines are used, the reports are to be included with the tracings.

Where an ECG is known to be abnormal, copies of the previous ECG or reference to it (particularly regarding any changes) would be helpful and should speed CASA’s evaluation of the applicant.

Note that reports (whether by the DAME or other interpreter) should accompany all ECGs sent to CASA. Except for those already reported on by an approved specialist or interpreted by a self-reporting machine, CASA will arrange for a cardiologist to report on all ECGs. This process requires up to a week.

In future, CASA anticipates enabling on-line submission of ECGs via enhanced MRS Online. By then, CASA will likely require that all ECGs are reported on by a self-reporting machine, or interpreted and reported on by a cardiologist, physician or other specialist approved by CASA.

The DAME should also examine all ECGs and assess them as normal or abnormal, then provide details of any abnormality detected in the medical report.

Original issue ECGs performed for class 1 and class 3 applicants should be dispatched to CASA immediately following the examination. The DAME should read, assess and retain any future ECGs performed, except:

- At the first renewal after a class 1 or class 3 applicant’s 25th birthday and at designated intervals thereafter (refer to 1.4.7 ‘Special periodic Medical Examinations Required’), when copies are required for the applicant’s medical record maintained by CASA; and
- Any abnormal ECG must be sent to CASA, together with a cardiologist’s or other specialist’s report as appropriate.
1.4.2 Audiograms

The pure-tone audiogram performed by a DAME or any other person is treated by the Aviation Medicine Section as a screening test only, and is never used as the final arbiter of an applicant’s ability to meet the hearing requirements for a Medical Certificate. Audiograms performed by DAMEs are acceptable. However, any audiometer used for CASA-required audiograms must have been calibrated within two years of the date of such examinations.

The audiogram result is to be stated in the medical assessment form even when a printed results slip is included with the form when lodged.

DAMEs should enclose the audiogram result printout with the medical assessment forms for all original Class 1 and Class 3 applicants.

1.4.3 Special Hearing Tests

Where a supplementary speech test is required, this can only be performed by AHS as the calibrated tapes and other equipment required are not available elsewhere. If the applicant fails the speech-based hearing test, in some cases an in-flight test may be offered if he/she has a high level of aeronautical experience. Such an operational check will involve evaluation of relevant aspects of the applicant’s hearing by a CASA Flying Operations Inspector or an Authorised Testing Officer with test material transmitted from a control tower. Ideally the test should be conducted in the class of aircraft that is the same as that which the applicant normally operates.

Further information is available from CASA Aviation Medicine Section.

1.4.4 Assessment by Designated Aviation Ophthalmologists or Designated Aviation Eye Examiners

An applicant for original class 1 or class 3 medical certification requires routine assessment and reporting by a DAO or DAEE.

A class 1 applicant who has attained the age of 60 years requires further routine assessment and reporting by a DAO or DAEE. Further assessments are required at intervals of every two years thereafter (refer Section 1.4.7 ‘Special periodic medical examinations required’).

Any applicant for original medical certification who fails to meet the required visual standard also requires assessment and reporting by an ophthalmologist or optometrist, usually a DAO or DAEE. CASA will determine subsequent requirements on a case-by-case basis.
Where a DAME detects or suspects ophthalmic pathology in any applicant for medical certification, referral to a DAO for further assessment is required.

A small number of experienced class 3 medical certificate holders have been ‘grandfathered’ so as to retain their medical certification, despite being unable to meet the colour vision requirements of the class 3 standard.

### 1.4.5 Temporary Incapacity of Certificate Holders

Refer CASR 67.265 and CASR 67.270.

CASA requires medical certificate holders who experience any medically significant changes in medical condition to inform CASA or a DAME of such changes.

The information is required to be conveyed to CASA or a DAME after the applicant has been aware of the change:

- For a class 1 medical certificate holder, for longer than 7 days
- For a class 2 medical certificate holder, for longer than 30 days
- For a class 3 medical certificate holder, for longer than 30 days.

Thereafter, the DAME so informed is required to notify CASA of the matter within 5 working days. Refer CASR 67.125.

A licence holder must not perform any act authorised by the licence while he or she has a medically significant condition which impairs his or her ability to do the act. Before resuming the exercise of privileges under the licence, the licence holder must obtain prior confirmation of fitness from a DAME, as follows:

- For a class 1 licence holder, where the medically significant condition has been present for longer than 7 days
- For a class 2 licence holder, where the medically significant condition has been present for longer than 30 days
- For a class 3 licence holder, where the medically significant condition has been present for longer than 30 days.
A DAME usually need not perform a full medical examination in these circumstances, but should satisfy himself/herself that the applicant has recovered from the illness, injury or other medically significant condition and meets the required medical standard for exercise of the privileges of any licence held. Therefore, a DAME should not issue a medical certificate of the ‘X will be fit for duty from some later date’—type in anticipation of full recovery sufficient to meet the required medical standard.

Licence holders who fail to observe these requirements may be subject to heavy penalties, so DAMEs should take every opportunity to emphasise these legal requirements to them.

Certain trivial conditions in medical certificate holders need not be reported to CASA unless present at an applicant’s routine medical assessment. However, DAMEs are to advise applicants that these conditions must have resolved fully, without sequelae, prior to applicants resuming the exercise of privileges. Common examples include the following:

- Influenza, coryza, other URTI
- Cough in the absence of wheezing
- Sinusitis
- Occasional, mild headaches
- Uncomplicated urinary tract infection
- Gastroenteritis
- Uncomplicated haemorrhoid(s) if not bleeding and requiring only symptomatic treatment
- Mild allergic rhinitis, if no nasal blockage present and no antihistamine treatment required
- Minor soft tissue injuries without residual pain
- Muscular pain of short duration not requiring long-term medication and not related to any significant underlying chronic illness
- Dysmenorrhoea not requiring medication or absence from work
- Treated chronic fungal nail infections
- Dental extractions.

1.4.6 Additional Investigations and Specialist Opinions

The DAME should refer an applicant (or arrange referral through the applicant’s usual general practitioner) for appropriate specialist review(s) and/or other investigations whenever a significant abnormality in the history or physical examination of an applicant is detected. The purpose of such review or investigation is to clarify whether the applicant meets the required standard(s) for medical certification, or whether medical certification with appropriate conditions is compatible with the safety of air navigation.
Once the DAME has collated all relevant investigations and reports concerning the applicant, these should be sent to CASA, together with the DAME’s own assessment of whether the applicant meets the required standard(s) for medical certification, or whether medical certification with appropriate conditions is compatible with the safety of air navigation.

Where an applicant fails to return for follow up or completion of the assessment is delayed for more than one month for any reason, the DAME should forward to CASA advice of the situation and copies of any reports available. Thereafter, in the event of further delays, or of the applicant failing to return for review, the DAME should advise CASA as then appropriate. Written, faxed or e-mailed advice is required in these circumstances.

Note: MRS online will automatically capture incomplete medical examinations and highlight them for CASA’s attention 14 days after the examination has begun. CASA may then contact the DAME for an explanation of the circumstances surrounding the delayed completion of the assessment.
1.4.7 Special Periodic Examinations Required

<table>
<thead>
<tr>
<th>Certificate</th>
<th>Frequency</th>
<th>Requirements on Initial Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1 ATPL</td>
<td>12-monthly until age 60, then 6-monthly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
<tr>
<td>Class 1 CPL</td>
<td>12-monthly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
<tr>
<td>Class 2</td>
<td>Four-yearly until age 40, then two-yearly</td>
<td>FEV₁</td>
</tr>
<tr>
<td>Class 3</td>
<td>Two-yearly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
</tbody>
</table>

Examinations are as follows:

<table>
<thead>
<tr>
<th>Audio</th>
<th>Hearing test — audiogram</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye</td>
<td>Specialist eye examination</td>
</tr>
<tr>
<td>ECG</td>
<td>Electrocardiogram</td>
</tr>
<tr>
<td>Serum Lipids</td>
<td>Total Cholesterol (fasting), HDL and LDL fractions</td>
</tr>
<tr>
<td>Blood Glucose</td>
<td>Blood Glucose (fasting)</td>
</tr>
<tr>
<td>Stress ECG</td>
<td>Exercise ECG on Bruce Protocol (no requirement for cardiologist referral)</td>
</tr>
<tr>
<td>FEV₁</td>
<td>Peak Flow (range is within 30% of the predicted value for height, sex and age – refer chart Peak Expiratory Flow in Normal Subjects)</td>
</tr>
</tbody>
</table>

Notes:

1. All ECGs performed in connection with medical examinations marked with an asterisk (*) in the ‘Age’ column in the Class 1 and 3 table below are to be forwarded to the Aviation Medicine Section.

2. All abnormal ECGs are to be forwarded to the Aviation Medicine Section with medical assessment forms.

3. Each applicant for a class 1 or class 3 medical certificate who scores 15 or more points on the American Heart Association Coronary Heart Disease Prediction Chart must undergo a stress ECG in accordance with the instructions at Section 2.2.6.
(Notes: Contd)

4 Each applicant for a class 1 or class 3 medical certificate should have his/her risk score calculated at the original medical examination, then at the first medical examination after age 25, thereafter every 5 years until age 60, thereafter annually.

5 Fasting serum lipid estimations must include total cholesterol, high and low density lipoprotein cholesterol fractions: be certain to specify this on the pathology request form as an 'Occupational Requirement'. (This alerts the pathology laboratory that the investigation is not HIC rebatable and usually ensures it will be performed, even when other lipid values are within normal limits).

6 On occasions, applicants may have undergone certain of these tests or specialist reviews independently of the CASA requirement. CASA will accept certified true copies of recent results (only). Guidance on acceptable recency is contained in Section 1.8. Frequently Asked Questions.
Classes 1 and 3 Additional Requirements

The table below gives the additional tests/examinations that are required at each renewal examination for applicants for Class 1 and 3 Medical Certificates. Requirements for applicants aged more than 80 years will be advised individually.

<table>
<thead>
<tr>
<th>Age</th>
<th>Tests/Examinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>25*</td>
<td>Audio Serum Lipids and Blood Glucose  ECG</td>
</tr>
<tr>
<td>30*</td>
<td>Audio Serum Lipids and Blood Glucose  ECG</td>
</tr>
<tr>
<td>32</td>
<td>ECG</td>
</tr>
<tr>
<td>34</td>
<td>ECG</td>
</tr>
<tr>
<td>35</td>
<td>Audio Serum Lipids and Blood Glucose  ECG</td>
</tr>
<tr>
<td>36*</td>
<td>ECG</td>
</tr>
<tr>
<td>38</td>
<td>ECG</td>
</tr>
<tr>
<td>40*</td>
<td>Audio Serum Lipids and Blood Glucose  ECG yearly from age 40 to 80 for Class 1 and every two years for Class 3 (see note 3 (above) re stress ECG)</td>
</tr>
<tr>
<td>45*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>50*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>55*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>60*</td>
<td>Audio Serum Lipids and Blood Glucose  Eye</td>
</tr>
<tr>
<td>62*</td>
<td>Eye</td>
</tr>
<tr>
<td>64*</td>
<td>Eye</td>
</tr>
<tr>
<td>65*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>66*</td>
<td>Eye</td>
</tr>
<tr>
<td>68*</td>
<td>Eye</td>
</tr>
<tr>
<td>70*</td>
<td>Audio Serum Lipids and Blood Glucose  Eye</td>
</tr>
<tr>
<td>72*</td>
<td>Eye</td>
</tr>
<tr>
<td>74*</td>
<td>Eye</td>
</tr>
<tr>
<td>75*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>76*</td>
<td>Eye</td>
</tr>
<tr>
<td>78</td>
<td>Eye</td>
</tr>
<tr>
<td>80</td>
<td>Audio Serum Lipids and Blood Glucose  Eye</td>
</tr>
<tr>
<td>&gt; 80</td>
<td>Requirements advised individually.</td>
</tr>
</tbody>
</table>
1.4 Special Investigations

1.4.8 Other Special Examinations

Applicants for class 1 or class 2 medical certification who fail the Ishihara Pseudoisochromatic Plates (PIP) colour vision test are to be referred to a centre that conducts Farnsworth Lantern (FALANT) testing. Applicants for class 1 or class 2 medical certification who fail the Farnsworth Lantern tests are to be referred for practical signal light testing. Contact CASA Aviation Medical Section on 131 757 (toll free) or 02 6217 1641 (direct), for details of how to arrange this testing. Note that colour vision testing for these applicants is to follow the sequence PIP → FALANT → practical signal light testing. A pass on any of these tests will satisfy the requirements for issue of an unrestricted class 1 or class 2 medical certificate.

New applicants for class 3 medical certification are required to pass the Ishihara PIP colour vision test. No additional or alternative colour vision testing is available for this group. A small number of experienced class 3 medical certificate holders have been ‘grandfathered’ so as to retain their medical certification, despite being unable to meet the colour vision requirements of the class 3 standard.

For certain applicants, routine periodic urinalysis for drugs is a requirement of continued medical certification. It is medico legally essential that such testing be performed in accordance with a specified protocol. This protocol will be notified in due course.
1.5.1 General

Whenever appropriate, CASA places a condition or conditions of use on an applicant’s medical certificate(s) which influences the validity of the medical certificate(s). Multiple conditions may be placed on a medical certificate, and different conditions may be placed on different classes of medical certificate held by an individual.

1.5.2 Frequently Used Conditions Endorsed on Medical Certificates

<table>
<thead>
<tr>
<th>Endorsement</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renew by CASA only.</td>
<td>The DAME may not revalidate the medical certificate. Any revalidation or renewal is the prerogative of CASA Medical staff</td>
</tr>
<tr>
<td>Visual correction required.</td>
<td>Applicant requires visual correction in order to meet the visual standard. Appropriate correction must be worn when exercising the privileges of the licence. (Class 3 certificates only).</td>
</tr>
<tr>
<td>Assured Visual Correction Required</td>
<td>Applicant requires visual correction in order to meet the visual standard. Appropriate correction must be worn and a spare pair of prescription spectacles must be carried/readily available when exercising the privileges of the licence.</td>
</tr>
<tr>
<td>Near Vision Correction</td>
<td>Applicant requires visual correction in order to meet the near vision standard. Appropriate correction must be readily available and a spare pair of prescription spectacles carried/readily available when exercising the privileges of the licence.</td>
</tr>
<tr>
<td>Not valid for mustering or agricultural flying.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Valid in Australian Airspace only.</td>
<td>This endorsement indicates that the medical certificate is issued despite the holder’s failure to meet a required medical standard, as the safety of air navigation is not adversely affected. Use in any other ICAO contracting state requires specific advance approval by the Regulator for that state.</td>
</tr>
<tr>
<td>Valid in Australian airspace Only, valid up to and including CPL</td>
<td>Self-explanatory</td>
</tr>
</tbody>
</table>
## Designated Aviation Medical Examiner's Handbook

### 1. Administrative Aspects

#### 1.5 Medical Certificate Endorsements

Approved by Assistant Director, Aviation Safety Standards  
Version 3.0: December 2003

<table>
<thead>
<tr>
<th>Endorsement</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not valid for ATPL operations.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Not valid for rotary wing operations.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Special conditions apply</td>
<td>Detailed, individually determined conditions are provided.</td>
</tr>
<tr>
<td>Special conditions apply, Notified in accompanying letter dated dd/mm/yyyy</td>
<td>Detailed, individually determined conditions are set out in the referenced letter, which must be carried with the medical certificate whenever exercising the privileges of the licence.</td>
</tr>
<tr>
<td>Holder to fly as or with a qualified copilot.</td>
<td>Refer 1.5.3 Multi-Crew Endorsement.</td>
</tr>
<tr>
<td>Holder is required to inform employer of the nature and extent of his/her medical impairment and to co-operate in establishing mitigation strategies to minimise the effect of this impairment</td>
<td>Self-explanatory (Class 3 certificates only).</td>
</tr>
<tr>
<td>Holder may exercise the privileges of the licence without supervision, but there must at all times be another licensed air traffic controller who is aware of the holder’s impairment present and able to assume the holder’s air traffic management duties should the holder experience sudden incapacitation</td>
<td>Self-explanatory (Class 3 certificates only.)</td>
</tr>
</tbody>
</table>
1.5.3 Multi-Crew Endorsement

CASA uses multi-crew endorsements as a means of risk mitigation. Their use enables pilots to continue flying and air traffic control staff to continue duty despite the presence of medically-significant conditions which would otherwise pose an unacceptable risk to the safety of air navigation.

When a class 1 or class 2 medical certificate is endorsed with the condition ‘Holder to fly as or with a qualified co-pilot’, all of the following conditions apply:

1. The holder is restricted to operating either as or with a qualified co-pilot while exercising the privileges of the licence validated by the medical certificate. (Note that it is sometimes possible for an applicant to have an ‘as or with co-pilot’ restriction on a class 1 medical certificate but an unrestricted class 2 medical certificate).

2. Aircraft requirements:
   a. side-by-side seating in the cockpit
   b. fully functioning dual controls.

3. Certificate holder requirements:
   a. to wear shoulder restraint harness at all times
   b. to be prepared to relinquish command or control of the aircraft at the onset of any incapacity
   c. to ensure that the other pilot has read the requirements in this document.

4. Other pilot’s requirements:
   a. to occupy a control seat except for short absences in transport category aircraft in the cruise with the autopilot engaged
   b. to hold command endorsement for the aircraft
   c. to be current and appropriately rated for the flight
   d. to be aware of the type of incapacity the pilot may suffer in flight
   e. to be prepared to take command of the aircraft should the other pilot be unable to continue command.

**Note:** This condition does not:
   a. Preclude the medical certificate holder from being left on the flight deck alone in a 2-pilot operation; or
   b. limit the medical certificate holder from operating in a 2-pilot operation with another individual who has a medical certificate with this restriction; or
   c. preclude the medical certificate holder from operating as a single pilot on a flight deck should the other pilot in a 2-pilot operation become incapacitated.
When a class 3 medical certificate is endorsed with the condition ‘Holder is required to inform employer of the nature and extent of his/her medical impairment and to co-operate in establishing mitigation strategies to minimise the effect of this impairment’, the following applies:

The holder who has such a restriction on a class 3 medical certificate is required to inform his/her employer of the nature and extent of his/her medical impairment and to co-operate with the employer in establishing strategies to minimise the risk of his/her impairment causing acute incapacitation. Relevant strategies may include, but are not limited to, measures such as special roster or shift arrangements, specified meal breaks, or guaranteed access to prescribed facilities.

When a class 3 medical certificate is endorsed with the condition ‘Holder may exercise the privileges of the licence without supervision, but there must at all times be another licensed air traffic controller who is aware of the holder’s impairment present and able to assume the holder’s air traffic management duties should the holder experience sudden incapacitation’, the following applies:

The holder who has such a restriction on a class 3 medical certificate is not permitted to undertake duty alone and is required to ensure, at the beginning of each shift, that his/her co-workers are aware of the type of incapacity the individual may experience while working and that at least one co-worker is available at all times to take over the individual’s air traffic management duties should such a sudden incapacitation eventuate.
1.6 Designated Aviation Medical Examiner Recommendations

1.6.1 General Matters

Procedures for dispatching routine medical assessment reports to CASA will be detailed in the *MRS Online Program Manual* currently under development.

**Applicant statement and examiner certification forms** should be forwarded to CASA as soon as possible following completion. On receipt, they will be scanned and attached to applicants’ medical files. (Note: CASA intends to develop more efficient alternatives to this procedure in subsequent versions of MRS Online).

ECG recordings, pathology and imaging reports and specialist consultation reports, as hard copies, should be forwarded to CASA as soon as possible following completion or when received by the examiner. Legible scanned copies of such documents may also be sent to CASA as attachments to medical assessment reports submitted online.

Lossy compression graphic formats such as JPEG should not be used because of the loss of information that accompanies the compression process. Do not attempt report scanning unless certain of the properties of the format used. CASA Aviation Medicine Section will provide further advice on request. (Note: CASA intends to develop subsequent versions of MRS Online that facilitate online lodgement of virtually all usually required documents).

Poor quality reproductions of such reports are of no use to CASA and DAMEs will be required to send replacements if MRS is unable to capture a legible image. This problem particularly arises with photocopied documents that are transmitted by facsimile.

Once a medical assessment report is received, the MRS Expert System will automatically determine whether or not the applicant clearly meets the medical standard(s) for the class(es) of medical certificate(s) sought. If the required medical standard is met, an automatic e-mail advice will immediately be dispatched to the originating DAME.

**CASR 67**

On receipt of such e-mail advice, a DAME may revalidate an applicant’s existing medical certificate for the appropriate period specified in the Regulations. Refer **CASR 67**.

**CASR 67**

If, for any reason, a DAME is unable to dispatch a routine medical assessment report immediately following its completion, but considers that an applicant meets the required standard for medical certification, the DAME may then revalidate the applicant’s existing medical certificate for the appropriate period specified in the Regulations. Refer **CASR 67**.
A DAME usually must not revalidate any medical certificate unless:

- e-mail advice from CASA confirms that the applicant meets the required medical standard; or
- he/she is unable immediately to dispatch a routine medical assessment report to CASA, but considers that the applicant meets the required medical standard; and
- the existing medical certificate does not bear the condition ‘Renew by CASA only’.

However, where the holder of a class 1 medical certificate which has been issued for 12 months is an ATPL aged over 40 who requires a medical assessment every 6 months to meet ICAO’s requirements (Refer to Section 2.15), a DAME may revalidate the existing medical certificate in the usual way for 2 months from the date of the examination, even though this period falls within the medical certificate’s continued validity for exercise of privileges in Australian airspace.

In this circumstance, the DAME should endorse the applicant’s medical certificate as follows:

‘Re-examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (this will usually be the date 2 months after the assessment date)

signature, date, DAME stamp

When a medical assessment report indicates that an applicant fails to meet the required standard for medical certification in any particular, the case will then be reviewed by CASA’s clerical assessors and/or medical staff and further advice provided to the applicant, DAME or other examiner as appropriate.
1.7.1 Aviation Reference Number (ARN) Identification

An applicant's Aviation Reference Number (ARN) must accompany all medical reports, ophthalmologists' reports, audiology reports and other specialists' reports and all correspondence concerning applicants sent to Aviation Medicine Section. All applicants should obtain an ARN prior to making an appointment with a DAME, DAO or DAEE for Original assessment. An ARN is required so the DAME or other examiner can connect to CASA's Medical Records System (MRS) to enter the applicant's medical details.

1.7.2 Aviation Reference Number (ARN) Registration

Application for an ARN can be made in person or by post. Application forms are available from the CASA website – refer Form 1162. Alternatively, visit one of the CASA Area Offices to apply in person.
A selection of frequently asked questions and answers to them is given below.

Q. When an applicant has had a required test or consultation independently some time before an equivalent CASA-required examination etc, under what circumstances will CASA accept such an examination in lieu of its own requirement?

A. The results of such external examinations are usually accepted only:
   ○ where the result/report is credible in all the circumstances;
   ○ where all parameters which CASA requires to be addressed in the report have been so addressed; and
   ○ where the reported findings are sufficiently recent to be likely still valid at the time of the applicant’s assessment for medical certification.

Note: CASA will not usually accept ophthalmological or audiometry reports which have not been completed on its own (electronic) stationery, even when these tests were performed for another Regulator, because of slightly different requirements and potential difficulty with interpretation.

Q. When an applicant has had a required test or consultation independently some time before an equivalent CASA-required examination etc, and it appears otherwise acceptable per provisions of the preceding paragraph, for how long will CASA deem such an examination to remain valid in lieu of its own requirement?

A. The usual maximum validity periods for independent routine test reports which CASA will accept are:
   - audiogram: 12 months
   - ECG: 6 months (applicant < 40 years), 3 months (applicant +/- 40 years)
   - fasting blood lipids/glucose estimations: 6 months
   - ophthalmology reports: 6 months

If any results are abnormal or equivocal, repeat studies will be required.

Q. When an applicant has had a clinically-indicated test or consultation independently some time before an equivalent CASA-required examination etc, under what circumstances will CASA accept such an examination in lieu of its own requirement?

A. CASA will deal with each such case on its individual merits. DAMEs and other medical practitioners involved in an applicant’s case management are encouraged to contact medical staff at CASA’s Aviation Medicine Section to discuss individual requirements.
Q. What are CASA’s requirements for medical certification of NZ-qualified pilots who are granted equivalent Australian medical certificates under the terms of the Trans Tasman Mutual Recognition Act (TTMRA)?

A. The TTMRA and the reciprocal NZ legislation apply only to professional licence holders, so effectively concern only Class 1 licence holders. The legislation is completely silent on the issue of medical certification, so CASA and CAA NZ have agreed to deal identically, as follows, with affected pilots whose initial qualifications were gained in the other country but who now have a local licence.

The CAA NZ medical certificate used to validate the original (NZ) licence may be used to validate the newly issued Australian licence until expiry of the NZ medical certificate. (For a class 1 medical certificate, this may permit a validity period of up to 12 months). The relevant authority for this is CAR 5.04 (2).

The licence holder is required to carry the CAA NZ medical certificate when exercising the privileges of the newly issued Australian licence, and also to observe any conditions set out on that medical certificate or in an accompanying letter issued by CAA NZ.

On expiry of the CAA NZ medical certificate, the holder of the licence granted under TTMRA is required to undergo a full CASA ‘Original’ Class 1 medical assessment, including ophthalmology report, audiometry, fasting blood lipid and glucose estimations and resting ECG. As for other Class 1 applicants, a stress ECG should be arranged if indicated. Thereafter, these licence holders will be required to meet identical requirements to all other Class 1 medical certificate holders, including the usual suite of periodically required screening tests.

Q. For how long after blood donation should licence holders/applicants who donate blood refrain from exercising the privileges of an aviation licence?

A. CASA recommends that holders of all classes of medical certificates should usually refrain from exercising privileges of any aviation licence for at least 24 hours after a routine blood donation. In other or unusual circumstances, consultation with a DAME or contact with CASA Aviation Medicine Section is advisable before resuming exercise of privileges.
2.1 Ophthalmology

2.1.1 Overview

Visual cues provide the pilot's most important sensory input. Good visual acuity over all working distances is essential for safe operation of an aircraft. Information should be sought about the range of visual performance required of each pilot so that relevant advice may be given about suitable correction, if required, and about protection against glare.

If there is any doubt whether a pilot meets the required visual standard, referral to a CASA Designated Aviation Ophthalmologist (DAO) or Designated Aviation Eye Examiner (DAEE) for a detailed assessment and report is mandatory. A standard form has been developed for routine ophthalmological examination required for professional aircrew and ATCs (see also 6. Aviation Medicine Forms). Original examinations must be undertaken by a DAO or DAEE.

Visual Requirements Standard – CASR Part 67

The visual requirements standards are found in the following paragraphs of CASR Part 67:

- CASR 67.150 For medical standard 1
  - Table 67.150
    - 1.31 – 1.39

- CASR 67.155 For medical standard 2
  - Table 67.155
    - 2.31 – 2.39

- CASR 67.160 For medical standard 3
  - Table 67.160
    - 3.29 – 3.37
2.1.2 General Visual Requirements

The Medical Standards in the Civil Aviation Safety Regulations (CASRs) stipulate that the functions of the eyes and their adnexae shall be normal. This requirement encompasses more than simply visual acuity. All Designated Aviation Medical Examiners (DAMEs) and Designated Aviation Ophthalmologists (DAOs) and Designated Aviation Eye Examiners (DAEEs) must satisfy themselves that this criterion has been fulfilled before assessing a pilot as meeting the required visual standard.

All applicants for initial issue of a Class 1 and/or 3 Certificate must be seen by a DAO or DAEE. All applicants for issue of a Class 1 and/or 3 Certificate must be seen by a DAO or DAEE at the time of first renewal of medical certificate after reaching the age of 60 years and at two-yearly intervals thereafter.

2.1.3 Refractive Error

Some degree of refractive error is found in the majority of eyes. Most of these errors are simple and are due to a slight lack of coordination of development of the various parts of the refractive system. They represent, therefore, a biological variation from the norm and should not be regarded as pathological.

Pathological refractive errors are relatively uncommon. They are due to gross developmental abnormality. The degree of error is usually high and the visual acuity is often not fully correctable while, particularly in myopia, the eye may show degenerative changes.

At birth, the majority of eyes are hypermetropic. From then until the age of eight years, this hypermetropia is seen to increase. After age eight, refraction becomes less hypermetropic (or more myopic) until approximately the age of 25 to 30 years, when relative stability is reached.
If, therefore, a young applicant has had less than the average degree of hypermetropia at birth, the natural shift to the more myopic side can result in the development of overt myopia, a development that is likely to progress until the age of 25 to 30 years, when some degree of stability is reached.

It is difficult to give an accurate prognosis of the progress of refractive errors since individuals do not necessarily conform to the population norm, and those who develop frank myopia frequently progress to the myopic side more rapidly than those who remain on the hypermetropic side of the population norm.

CASA has not placed restrictions on applicants who require high levels of correction in order to meet the required visual standards. CASA considers that ability to meet the standard is all that is required, regardless of the power of corrective lenses necessary to achieve this outcome.
2.1.4 Refractive Surgery

**Radial Keratotomy (RK)**

The role of radial keratotomy in reducing refractive errors is a significant current issue in aviation medicine. Persons who have undergone this procedure are often subject to diurnal fluctuation in visual acuity. If this is significant, (i.e. loss of more than one Snellen line for professional licence applicants and more than two Snellen lines for private licence applicants) **even if an applicant’s visual acuity is still within the pass standard**, this fluctuation constitutes failure to meet the visual requirements of the standard(s) concerned.

Applicants who undergo radial keratotomy before their myopia has stabilised are at risk of continuing progression of their myopia.

The long-term consequences of radial keratotomy are not yet well documented, so it is impossible to predict any long-term implications for pilot licensing. Applicants should be reminded of this uncertainty as it may affect their chances of employment in the aviation industry.

Following radial keratotomy, the refraction takes some time to stabilise to its new value. Flying is not permitted while the refraction is still plastic. Evidence of stability requires:

- A variation not exceeding 0.25 dioptres in refraction
- A visual acuity changing by not more than one Snellen line
- Visual acuity, which at least satisfies the minimum standard for the class of licence, at three paired serial measurements.

These three paired serial measurements are to be part of a full ophthalmological examination, are to include measurements early in the morning and late in the day, and must be delayed for at least three months following surgery. Note that some eyes may not have stabilised even as late as a year after surgery.

A second problem associated with radial keratotomy is sensitivity to glare. This can cause considerable difficulty in the healing phase but tends to settle with time. Testing of visual performance with a bright light shining at the applicant should demonstrate any continuing glare sensitivity.

All applicants whose eyes have stabilised following radial keratotomy must thereafter have an ophthalmological assessment every two years for Class 1 and 3 and every five years for Class 2 Medical Certificates.
**Photo-ablative Refractive Keratectomy (PRK)**

This is a new technique, using a laser, for changing refraction. The long-term implications are as yet unknown. The requirements for assessing stability after radial keratectomy outlined above should be followed after photo-ablative refractive keratectomy.

### 2.1.5 Monocular Pilots

Monocular pilots may be divided into two categories:

- The monocular condition—the situation in which an applicant has only one functioning eye.
- The functionally monocular condition—the situation in which an applicant has two eyes, but the visual acuity of one cannot be corrected to 6/9 or better.

Provided the visual acuity requirements can be met in the functioning eye, with or without correction, a waiver is granted for Class 2 certification, limited to Australian Airspace, for both the monocular condition and for functionally monocular pilots. Likely Conditions on an applicant’s Medical Certificate are:

- Not valid for mustering or agricultural flying.
- Valid in Australian airspace only.
- Special conditions apply.

Functionally monocular pilots who can meet the visual acuity standard with the remaining eye may obtain Class 1 certification. These applicants are required to show that flight safety is not jeopardised by the reduced visual acuity or absence of the other eye. Only the Aviation Medicine Section can issue this waiver. Likely Conditions on the resulting Medical Certificates are as set out above for Class 2 Medical Certificates.
2.1.6 Visual Acuity

**Distant Vision**

Record the uncorrected distant visual acuity in each eye separately, also binocular acuity. If the applicant wears correcting lenses, record the corrected acuity also for each eye and binocularly. For original examinations, check visual acuity without contact lenses and then with contact lenses. Acceptable values are as follows.

**Student and Private Pilots**

For students and private pilots, acceptable values are at least 6/12, corrected if necessary, in each eye. An acuity of at least 6/9 (with or without correction) with both eyes open is also required.

If the student or private pilot applicant cannot achieve 6/12 (with or without correction) in each eye, the DAME should inquire about the defective eye and record the cause.

In cases of doubt, referral to a CASA Designated Aviation Ophthalmologist or prescribing optician is indicated. These applicants may be acceptable for non-commercial licences; however, their licences will carry endorsements restricting operations to Australia.

By definition, if an applicant achieves no better than 6/12 in the poorer eye, the applicant is considered to be functionally monocular.

Applicants assessed as suitable for licensing with appropriate endorsements are required to have a stable visual condition to which they have adjusted. This provision affects pilots who have poor foveal static visual acuity but whose peripheral vision is normal (in practice, amblyopia). Those who have completely lost an eye or its vision may be assessed as fit after the Aviation Medicine Section’s consideration of such factors as the extent of visual field loss and the duration of the condition.

**Professional Flight Crew and ATCs**

For all professional flight crew and ATCs: 6/9, corrected if necessary, in each eye separately. Additionally, the acuity must be 6/6 or better when tested with both eyes open.

Applicants with high refractive corrections (i.e. greater than +/-5 dioptres) should be advised of the possible complications, which may affect their vision, and of the implications for their aviation careers, particularly their increased statistical chance of retinal detachment.

**Note** The equivalent spherical error is taken as the sum of sphere power plus half that of the cylinder, the calculation taking account of arithmetical signs.
**The High Myope**

CASA prescribes no limit and high myopes who meet the standard after correction are assessed as meeting the standard. The final decision in cases of high myopia depends on the applicant’s functional visual ability and on the absence of significant ocular pathology.

Although high-density lens material has enabled the lenses in corrective spectacles for applicants with high myopia to be thinner and so not cause unacceptable peripheral distortion, contact lenses are the preferred method of visual correction for myopes who require more than 5 dioptres of correction.

**Near Vision**

Near vision at all ages must meet the standards specified in the CAR Schedule (N5 with or without correction at 30-50cm and N14 at one metre without correction). DAMEs must check this function at every periodic medical examination for all applicants for aviation licensing.

Professional flight crew should be advised to have periodic ophthalmological examinations from age 45 to detect early signs of developing ocular pathology.

If an applicant cannot meet the standard, he or she should be referred for an ophthalmological assessment and appropriate spectacles prescription.

Near-vision spectacles have a limited range of clear vision, which depends on the power of the lenses prescribed and on the residual accommodation of the wearer.

It is vitally important that the range of clear vision encompasses all the near objects that need to be seen clearly. Typically this ranges from the reading of maps and operating manuals at ordinary reading distance to reading the more distant parts of the instrument display at a distance of one metre or more.

It is important that the spectacles prescribed are suited to the near working distances imposed on the pilot by the configuration of the flight deck of the aircraft. This becomes increasingly critical as an applicant’s presbyopia progresses with age.

The pilot should measure the working distances encountered in all seating positions on the flight deck, and record them prior to having a prescription for near vision determined. A suggested checklist for pilots is as follows.
2.1.7 Working Distances Checklist

<table>
<thead>
<tr>
<th>Object</th>
<th>Nearest (cm)</th>
<th>Farthest (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flight instruments</td>
<td></td>
<td></td>
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<tr>
<td>Engine instruments</td>
<td></td>
<td></td>
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<tr>
<td>Checklists</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic Flight Instrument Systems (EFIS) and flight management display</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach charts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General charts and manuals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Overhead Panels**

Overhead panels can cause difficulty because of their close proximity to the pilot’s eyes. This proximity ensures that the presbyopic pilot has difficulty seeing legends and numerals clearly, yet in order to view through the near segment of bifocals or through look-overs it is necessary to tilt the head back awkwardly. This may present particular difficulty in some aircraft types.

Possible solutions to difficulty in viewing overhead panels:

- The simplest solution is to lift the bifocals (or look-overs) so that the head does not have to be tilted so far back.
- Flip-down spectacles can be provided with an additional lens power to focus the overhead panel clearly when viewing through the upper distance part of the bifocal lens. However, flip-downs are cumbersome and there is a risk that they may be left down, causing blurring of distance vision. There is also a risk that they may flip down inadvertently as a result of turbulence during some critical phase of flight.
- There are vocational multifocals available which have a near segment in the upper part of the lenses as well as in the lower part. However, the distance portion between the two segments is only 12 or 15mm deep giving a distant vertical field of view of only 21 to 26 degrees. Pilots may find this impedes their visual scanning.
- A special multifocal lens can be constructed to provide a small near viewing segment in one corner of the upper part of the lens.
The more complex solution should usually only be pursued if pilots experience significant and persistent problems with the overhead panel. The overhead panel usually does not demand perfect visual acuity and is not often used in critical phases of flight, so it should not be assumed that it presents serious operational difficulties.
2.1.8 Bifocal Segment Height

The height can be set so that the pilot views the instrument panel through the near segment as well as using it for charts and manuals at an ordinary reading distance.

Alternatively the segment can be set low so that it is used only for charts, manuals and reading. When viewing the instrument panel the pilot will look over the top of the near segment to use the distance part of the bifocal.

This choice will depend on:

- Whether or not the pilot is having any difficulty reading instruments on the forward instrument panel; and

- The pilot's residual accommodation. (At least 2.75 to 3.50D of accommodation is required to see the instrument panel clearly and comfortably through the distance part of the bifocals.)

If the segment is set low, the bifocals may not be suitable for everyday reading outside the aircraft. A separate pair of reading glasses of bifocals for everyday use may then be required.

**How to Determine the Correct Segment Height**

Optometrists and spectacle dispensers are skilled at setting the segment height correctly, but flying is a demanding occupation and it is worth taking pains to obtain an accurate prescription for the height of the near segment.

It is worth checking segment height on chosen frames or single lens distant vision glasses by stretching adhesive tape across the frame or lens whilst the pilot is seated in the cockpit. The position of the tape can be varied until its upper edge is at the height desired for the top of the near vision segment.
2.1.9 **The Need for Trifocals**

As presbyopia advances, the power of the near spectacle correction must be increased to compensate for further loss of accommodation power. As a result, the range of clear vision decreases.

For a pilot aged about 45 with 3.50D of residual accommodation, the power of the near addition typically prescribed is 1.00D. For this person, the range of clear vision is from two metres to 220mm, which should be more than adequate for all flight deck near-vision tasks. However, a pilot aged 50 to 55 with only 1.50D of residual accommodation is typically prescribed a near addition of 1.75D, giving a very much smaller range of clear vision from 800mm to 360mm. This range is suitable for near tasks at ordinary reading distances but does not permit clear vision of those parts of the instrument panel beyond 800mm.

When this occurs, trifocals are required. Trifocals provide an intermediate segment that has approximately half the power of the lower near segment.

2.1.10 **Acceptable Forms of Correction**

To comply with operational requirements, reading correction must be in the form of ‘look-overs’, bifocal or trifocal lenses as appropriate. Single vision lenses for near correction are not acceptable. See the diagram below.

- **Bifocal Lens**
  - For reading

- **Look-over Lens**
  - For reading

- **Single Vision Lens**
  - Whole lens for reading **NOT** suitable for flying
2.1.11 Progressive Power Lenses

These lenses provide a variable focus depending on which part of the lens is used for viewing. They provide a narrow intermediate visual channel and larger distant and near areas. These lenses may be associated with illusions of movement and distortion in the peripheral field of view. They should only be used for flying after adaptation in flight as a non-critical crewmember.

2.1.12 Contact Lenses

Provided the following criteria are met, contact lenses may be worn for correction of distance vision.

Both hard and soft contact acuity lenses are acceptable. The pilot must be able to wear the lenses throughout an ordinary day without experiencing any discomfort or deterioration of vision.

An acuity of 6/9 in each eye is required with correcting spectacles immediately after removal or displacement of contact lenses.

The pilot and the prescriber are responsible for ensuring that the pilot has adapted to the contact lenses sufficiently to perform his or her aviation duties. The duty period depends on the type of operations in which the pilot is engaged. The length of time that contact lenses can be worn without producing discomfort differs for private/pleasure flying and long haul commercial operations.

The choice of lens depends upon the nature of the correction required and on cabin conditions encountered.

Hard lenses tend to induce more discomfort and can be displaced by propeller wash or strong wind. Should a pilot need to remove the lenses in flight and substitute spectacles, post-wearing blur with decreased visual acuity should be anticipated.

Soft lenses do not cause those problems to the same extent. However, they may not fully correct astigmatism of greater than one dioptre.

For high myopes, soft contact lenses are preferable to spectacles. In the greatest degrees of myopia, the required visual acuity standards may not be able to be met using spectacles.

For initial issue examination, the contact lenses should be removed and the applicant’s visual acuity checked while wearing spectacles. The uncorrected vision should also be recorded. At renewal medical examinations it is not necessary for the applicant to remove the contact lenses unless the examiner considers this clinically indicated.
2.1.13 Sunglasses

Glare is often a cause of significant discomfort when flying above cloud or when flying into the sun. Sunglasses may be required in such circumstances.

There are two basic factors to consider when selecting sunglasses, namely the frame and the lenses.

Any spectacle frame reduces the field of vision. Narrow frames that carry large lenses are desirable. The most critical problem with frames arises from the presence of wide side-arms which significantly impair the peripheral visual field.

Sunglass lenses should protect the eyes from glare while not adversely affecting the visual cues necessary for safe flight. Accordingly, lenses should not be too dark, and should transmit at least 15% of incident light. The tint used should be "neutral density" (N.D.), that is, a greyish tint that does not distort colour perception or adversely affect red signal detection and recognition. The recommended tint is N.D.15.

Lenses of polycarbonate are preferred because of their impact-resistance and ability to absorb ultra-violet and infrared rays. However, these lenses can scratch readily and any scratched spectacles should be discarded.

To ensure that sunglasses provide adequate protection from solar radiation that may damage the eyes, only those sunglasses that conform to the current Australian Standard should be worn.

Sunglasses that conform to the current Australian Standard also meet acceptable standards for lens quality, frame strength and lens retention.

For aviation use, those sunglasses marked "Specific Purpose Sunglasses" are recommended, provided their frames are appropriate. The lenses of these sunglasses have been specifically designed for use in conditions of intense glare, such as in flight above cloud. At high altitude, atmospheric absorption of ultra-violet radiation is reduced.

Polarising sunglasses should not be used when flying. The polarising filter interacts with the cockpit transparency to produce a distorted and degraded visual field that poses a threat to air safety.

The pilot who already wears prescription spectacles for flying can choose from a number of options for glare protection. Prescription sunglasses with N.D.15 lenses can be obtained, or N.D.15 clip-on or flip-up sunglasses may be worn over prescription spectacles.

Pilots who require correction of their near vision only and who wear "look-overs" are advised to obtain bifocals and a plano upper segment. Clip-on or flip-up sunglasses can then be worn. However, the dangers of flip-ups previously mentioned should be recalled.
Graduated lens tint is another option. This provides glare protection for distant vision outside the aircraft, while near vision inside the aircraft is not impeded by the tint. It is usually considered that the use of a single tinted segment in bifocal glasses should be avoided as the visual effect of a "false horizon" may be disturbing and dangerous.

### 2.1.14 Photochromics

Spectacles can also be prescribed with photochromic lenses — lenses that change their density depending on the ambient light level. Under bright conditions they are like sunglasses, while in darker conditions they transmit light almost as well as untinted lenses. However, photochromic lenses have disadvantages that render them unsuitable for use by pilots.

Firstly, their transition times are relatively slow. Photochromic lenses take about five minutes to increase their density to the level of sunglasses, but more importantly, the bleaching time from maximum to minimum density can be as long as 30 minutes or more, although there is a rapid lightening of the lens in the first five minutes. This may be too long when there is a sudden variation in light during a descent into or under cloud, or because of a rapid change in cloud cover.

Their second disadvantage is that, even when fully bleached, photochromic lenses still absorb slightly more light than untinted lenses. Since vision is critically dependent on ambient light levels at night or otherwise when light levels are low, even this small decrease of light reaching the eye through photochromic lenses is undesirable. The inherent degradation of these lenses with time effectively prohibits their use in flying or controlling air traffic and applicants should not use them in these circumstances.
2.1.15 Colour Vision

Normal colour perception is becoming increasingly important as colour-coded cathode ray tube displays and colour coded visual approach lights become more prevalent. If any element of doubt exists about a pilot's ability to perceive colour normally, the case should be referred to the Aviation Medicine Section.

**Commoner Types of Colour Vision Defects**

<table>
<thead>
<tr>
<th>Type (Incidence)</th>
<th>Essential Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protanomaly (1.0%)</td>
<td>Colour matches are different from those made by normals (anomalous colour matching). Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Extreme protanomaly (0.2%)</td>
<td>Reduced colour discrimination for red, yellow and green. Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Protanopia (1.0%)</td>
<td>Confusion of red, yellow and green. Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Deuteranomaly (4.5%)</td>
<td>Colour matches different from those made by normals.</td>
</tr>
<tr>
<td>Extreme deuteranomaly (0.5%)</td>
<td>Reduced colour discrimination for red, yellow and green.</td>
</tr>
<tr>
<td>Deuteranopia (1.5%)</td>
<td>Confusion of red, yellow and green.</td>
</tr>
</tbody>
</table>

**Test Procedure**

The DAME is required to conduct a colour perception test, using the Ishihara 24-plate test. This test should be conducted even if the applicant is to be referred to an ophthalmologist. If the applicant should incorrectly identify more than two of the Ishihara plates, a test on a Farnsworth lantern is needed to determine whether or not he or she meets the colour perception standard.

The Ishihara plates test should detect all red/green colour vision defectives. Examiners should be aware, however, that some applicants may have learned the plates, and their presentation in random order is important. Other applicants have been trained to identify numbers on the plates by means of brightness cues or may even attempt to pass the plate tests by wearing an X-chrom or similar lens—a red contact lens worn in one eye which improves the colour defective's performance on the test.
Plate Testing

Reliable colour vision testing using the pseudoisochromatic plates requires that a standardised procedure be followed carefully. The main points are:

Illumination

Only the following are permitted:

- Daylight (but not direct sunlight). This is preferred.
- Fluorescent light from a fluorescent tube of 6,500 degree K colour temperature (normal daylight tubes).
- Phillips 'Bleu' incandescent lamp.
- Macbeth Colour Source C.
- Where an applicant is unable to pass the test when it is performed under artificial lighting conditions, it should be repeated in daylight before a failure is recorded. However, this additional test is not required where an applicant makes more than 12 errors or gives a history of known defective colour vision.

Note

Before using fluorescent light, check the maker's label on the end of the tube to ensure the colour temperature is that specified. Tubes labelled "warm white" or "soft white" are not suitable.

Position

The applicant may stand or be seated, but should look squarely at the test plates from about 75cm distance. The applicant’s position should be adjusted so that no specular reflection from the glossy surface of the plates is observed. The applicant should not move his or her head while taking the test.

Exposure Time

Each plate is exposed for a maximum of five seconds.

Procedure In Detail

1. Check the applicant's position, illumination, watch or clock with second hand.
2. Open the book at the first (demonstration) plate.
3. Read out at conversational speed, pausing perceptibly where indicated.

“I am going to show you some pages of dots. On some of them you can see a number, but some have no number. I want you to tell me if you can see a number and what it is. (Pause.)

If you can't see a number, say "no number". You have up to five seconds for each page. (Pause)

Is that clear?”

4. Now expose each test plate in random sequence.

5. When the applicant responds, or after five seconds have elapsed, whichever is sooner, turn to the next plate. Most applicants respond almost at once.

6. If more than one response is given to a plate, eg, "It's either three or eight", say "which one are you going to choose?" If the applicant changes his or her response, record the second response.

Marking Standard

Applicants scoring two errors or less on the 24-plate edition of the Ishihara plates meet the required standard. Those making three or more errors need to be tested on the Farnsworth Lantern.

**Note:** If the DAME suspects that a filter aid is being used, each of the applicant’s eyes is to be tested separately and then binocularly. The results are to be notified to the Aviation Medicine Section.

Further Testing

Some applicants with defective colour vision may be safe for aviation duties, e.g. mild deuteranomals. The Farnsworth Lantern passes these while failing all protanopes and deuteranopes and most protanomals and the more severe deuteranomals.

The Australian locations of Farnsworth Lanterns are listed in 5. Colour Vision Testing. Farnsworth Lanterns are not transported to outlying areas. Examiners should refer applicants who fail the plate test directly to the nominated centres for Lantern testing. Such referrals should be noted on the examination form. If there is no record of such referral on the form, the Aviation Medicine Section notifies applicants of their right to undergo further testing.

**Note:** Applicants for original class 3 medical certification must pass the Ishihara Plate Test.
An applicant who fails to meet the colour perception standard (i.e. who fails both the Ishihara Plate Test and the Farnsworth Lantern, but who meets all other standards) is eligible for issue of an operationally restricted student pilot, private pilot or commercial pilot licence. The holder of such a licence is given a dispensation to operate at night in a suitably radio-equipped aircraft. This dispensation applies to Australian airspace only.

Class 1 and class 2 applicants who are unable to pass either the Ishihara Plate Test or Farnsworth Lantern Test may be further assessed by means of Practical Signal Light Test. Details are available from Aviation Medicine Section.

### 2.1.16 Cataract

Applicants who have undergone cataract extraction(s) and who achieve acceptable visual acuity with lens implant and/or contact lenses may be passed at all licence levels following individual assessment by the Aviation Medicine Section. Full reports are required.

All other cases of cataract should be referred to an ophthalmologist. A report including assessment and prognosis is required. The final decision in these cases is based on the ophthalmology report.
2.1.17 Demyelinating Disease

Multiple Sclerosis (MS) is a central demyelinating disease involving multifocal demyelination of white matter, which initially affects young people under 40 years of age. The diagnosis requires multiple attacks of demyelination separated in time and locations. A thorough neurological history is important at the time of presentation. Nuclear magnetic resonance imaging (MRI) offers some help in diagnosis but should not be substituted for good history taking.

The most common ocular manifestation of MS is optic neuritis. It is the presenting feature in 25% of cases and occurs during the course of established disease in 70%. Between 50% and 70% of patients in the 20 - 40 year age group presenting with optic neuritis subsequently develop systemic demyelination.

Optic neuritis typically presents as sudden unilateral blurred vision progressing over a few days. The vision is often described as being "washed out"; colours appear desaturated and there is often associated retro/peri-ocular pain aggravated by eye movements.

Signs include reduced acuity of variable severity from minimal to "no perception of light"; an afferent pupillary defect (pupil dilates during the "swinging light" test); and dyschromatopsia (poor colour discrimination performance).

The most common visual field defect is a central scotoma. Ophthalmoscopy may reveal a swollen optic disc although the disc is often normal in the retrobulbar type of MS. Optic atrophy (associated with previous attacks) may be found in the ipsi- or contra-lateral eye.

Visual recovery is slower than the initial loss and usually takes between four to six weeks. About 90% of sufferers recover normal visual acuity. Minor defects in colour vision and brightness appreciation may persist. The effects of subsequent attacks are additive. There is no correlation between the degree of visual defect during the attack and the final visual outcome.

All pilots with optic neuritis should be referred to a Designated Aviation Ophthalmologist. Examinations should include visual field plots of both eyes. A typical case may require CT and MRI scanning to rule out compression of optic nerves or chiasma.

Sinister features in applicants with MS include failure of visual recovery after four weeks, persistent periorcular pain, proptosis, development of a quadrantic or hemianopic visual field defect, and field defect in the contralateral eye. All cases with severe visual acuity loss (<6/60) should be further investigated.

Flying duties in between infrequent attacks are possible provided there is adequate neurological and visual function monitoring. All cases should be referred to the Aviation Medicine Section for final assessment after adequate work up.
2.1.18 Glaucoma

All applicants for flight crew licensing who have glaucoma, or whom the DAME suspects may have glaucoma, must be assessed by a Designated Aviation Ophthalmologist. The DAME should not revalidate their Medical Certificates.

**Primary Glaucoma**

**Closed Angle Glaucoma**

Applicants should not be passed until the condition has been surgically corrected. Once corrected, a pass assessment may be issued after ophthalmological review.

**Open Angle Glaucoma**

Most open angle glaucoma is controlled by medication. The Aviation Medicine Section may issue a pass assessment only after receipt of a satisfactory ophthalmologist's report, which must include results of perimetry.

Preferred treatment is with beta-blocker drops. However, applicants with glaucoma controlled by other means are assessed individually.

Open angle glaucoma that has been successfully treated by microsurgical or laser techniques may be assessed as meeting the required standard by the Aviation Medicine Section.

Open angle glaucoma controlled with drugs requires annual ophthalmological review, including perimetry.

**Secondary Glaucoma**

Medical assessment depends on the underlying disease and the effectiveness of control. All cases should be referred to a Designated Aviation Ophthalmologist.
2.1.19 Macular Disease

The symptoms of macular disease include blurring and distortion of vision with micropsia or macropsia, which can be assessed with an Amsler grid. (This consists of a piece of paper showing a 10cm square divided into 5mm squares with a central fixation dot).

The subject is asked to fixate on the central dot, with each eye separately, at one third of a metre and to mark on the chart with a pencil, scotomata or areas of distortion.

When abnormalities are present, immediate referral to a Designated Aviation Ophthalmologist is required.

The commonest conditions affecting the macula are Central Serous Retinopathy and Disciform Macular Degeneration. All cases require final assessment by the Aviation Medicine Section.

Central Serous Retinopathy

The condition affects healthy young men with a hectic lifestyle. Only one eye is usually affected and reduction of acuity is mild (6/12 or 6/18). With a direct ophthalmoscope, dulling of the macular reflex is seen, representing a shallow central retinal detachment.

Vision recovers spontaneously within six weeks in 90% of cases. Stereoaucity is temporarily lost and pilots should not fly until full recovery occurs. Laser treatment has been shown to speed the resolution of symptoms, but does not improve the final visual outcome, and no treatment is usually advised. The condition recurs in 20 to 30% of cases and the second eye is affected in 20%.

Macular Degeneration

This condition typically affects the elderly but inherited forms may affect younger people. Ophthalmoscopy may show small grey, yellow or white lesions, like small crystals, at the macula. These are called "drusen" (German, druse = nodule).

The visual acuity is usually well preserved, 6/9 or 6/12, until a further complication occurs — the development of a subretinal neovascular membrane that spreads under the macula and reduces vision to 6/60 or less.

To prevent the visual acuity from deteriorating below standard, regular follow-up is essential. In the early stages when the vision is distorted, but the acuity well preserved, the subretinal membrane can be obliterated by argon laser treatment.
2.1.20 Retinal Detachment

This may occur at any age although it is commoner in the elderly. Myopic people, particularly high myopes, are at increased risk. Advice on the long-term prospect of an aviation career should be given to those with high myopic refractive errors.

The most frequent type of retinal detachment follows collapse of the vitreous gel — Posterior Vitreous Detachment. The symptoms are a sudden shower of floaters (caused by vitreous haemorrhage or pigment release) and flashing lights, due to vitreous traction on the retina. Urgent referral to an ophthalmologist is mandatory to exclude the presence of a retinal tear.

At the stage when the retina is torn, but not yet detached, laser treatment may be used to seal the retinal tear before fluid from the vitreous cavity passes through it to detach the retina. Once the retina begins to detach, prompt surgery is necessary. If surgery can be undertaken before the retina detaches from the macula, the prognosis for maintained vision is excellent. Once the macula has been detached for more than a few hours, visual recovery is only partial.

A special form of retinal detachment, retinal dialysis, is the commonest type of detachment seen in young, otherwise healthy people who are not myopic. It may occur after a blunt injury, which causes a tear in the extreme periphery of the retina.

Intraocular gases are often injected into the vitreous cavity during retinal detachment surgery. The most commonly used gases are air, sulphur hexafluoride (SF6) and perfluoropropane (C3F8). Air takes only three or four days to be resorbed whereas the longest acting gas, C3F8, persists for up to six weeks. Air travel should be avoided until the gas bubble resorbs. Bearing in mind even in pressurised aircraft cabin altitude can be up to 8,000ft; a dangerous rise in intraocular pressure can occur if this precaution is overlooked.

In all cases of retinal detachment, once the condition is stabilised, a computerised visual field plot is mandatory before considering the applicant for return to pilot duties. The pilot should retain a copy of the plot for future comparison. The Aviation Medicine Section assesses each case individually.

2.1.21 Retinal Injuries

If a severe injury to the eye has occurred, with definite or suspected perforation of the globe, any aerial transport should be conducted at a cabin altitude of 4,000ft or less.
2.1.22 Strabismus

Whereas some degree of heterophoria is the norm, heterotropia (i.e. a manifest deviation of one eye from its normal position which occurs despite both eyes being open and uncovered), requires assessment by a Designated Aviation Ophthalmologist and final assessment, on an individual basis, by the Aviation Medicine Section. An applicant with an acuity (corrected or uncorrected) of worse than 6/12 is unacceptable, and a binocular acuity of worse than 6/9 is also unacceptable.

A majority of squint sufferers who have excellent cosmetic results from surgery and good visual acuity in each eye may still lack normal stereopsis (depth perception). They develop distance judgement by monocular cues and these are usually superior to those available to applicants who have lost an eye. However, their fine distance judgement for near distances is inferior to those with normal binocular vision. The Aviation Medicine Section individually assesses persons lacking binocular vision.

Squint may be latent or manifest. A latent squint is likely to become manifest under the influence of such factors as illness, fatigue, stress, drugs or alcohol. A cover test alternately on each eye unmasks latent squint.

The tests described below are designed to detect those who lack binocular vision.

**Cover Test**

Test at near (30cm) and at six metres. Use an accommodation fixation target at both distances. (For near an N5-size print and for distance a 6/12 letter). Ask subject to look at the fixation target, cover one eye and observe the other eye for refixation movement. Repeat test procedure for the other eye. Any refixation movement indicates possible squint.

**Lang Stereo Test**

Test at near (30cm). Hold card still and ask subject to name any pictures seen. Pass is three pictures: cat, star and car. A new Lang stereo test that tests to 200 degrees of arc is available. This may be considered superior to the standard Lang test that tests to 55 degrees of arc.

**Worth Four Dot Test**

Subject wears red/green goggles. Pass is identifying four lights, one red, two green and one white. Test at six metres only. Those who fail can undergo further tests, for example six-metre vectograph or Bagolini lens test to confirm if they truly lack binocular vision.
2.2 Cardiology

2.2.1 Introduction

This section details the requirements for cardiological assessment of an aircrew member or air traffic controller and provides guidance on the aeromedical disposition of pilots and cardiovascular disease.

The aim of the examination is to ensure that the applicant does not suffer from any cardiovascular condition which carries an increased risk of incapacitation or which produces a decrement of physiological functional reserve that may jeopardise operational safety.

The DAME should recognise that an individual with an unrestricted Medical Certificate must be capable of performing all of the activities that are possible under the licence held.

These activities could include:

- Aerobatics, with the possibility of high G forces being encountered
- Operations in extremes of temperature for long periods, and
- Operations at altitudes where the partial pressure of atmospheric oxygen is decreased to two-thirds that which exists at sea level.

2.2.2 The Cardiovascular Standard – CASR Part 67

CASP 67 The cardiovascular standards are found in the following paragraphs of CASR Part 67:

CASP 67.150 For medical standard 1
CASP 67.150(7)
Table 67.150
1.9 – 1.11

CASP 67.155 For medical standard 2
CASP 67.155(7)
Table 67.155
2.9 – 2.11

CASP 67.160 For medical standard 3
CASP 67.160(7)
Table 67.160
3.9 – 3.11
2.2.3 Assessment

The DAME should note relevant risk factors for ischaemic heart disease in assessing an individual’s cardiovascular system. The risk factors to be considered are:

- Age
- Total cholesterol (fasting estimation)
- The total cholesterol to HDL cholesterol ratio (fasting estimation)
- Blood glucose (fasting estimation)
- Cigarette smoking
- Systolic blood pressure
- Hypertension
- Diabetes Mellitus
- Obesity
- Lack of regular exercise
- Positive family history of cardiovascular disease.

An applicant with multiple coronary artery disease risk factors should be considered for more detailed examination such as stress ECG.

The requirements for mandatory 12 lead resting ECGs are detailed in section 1.4.1 Electrocardiographs in 1. Administrative Aspects.
2.2.4 General Principles

The following conditions are statistically associated with reduced functional capacity in cardiac reserve or with unpredictable risk of sudden incapacitation. Applicants with such conditions should therefore be assessed as medically unfit for certification. In individual cases, after thorough assessment, some may be granted Medical Certification.

- Uncontrolled systemic or pulmonary hypertension
- Any structural and/or physiological defect of the heart or circulation which results in regional circulatory ischaemia of a critical circulatory bed, or in ventricular hypertrophy or ventricular dilatation
- Any structural or physiological defect of the heart which results in electrical instability, either dysrhythmia or conduction defects
- A diagnosis of haemodynamically significant aortic stenosis
- Any structural or physiological defect of the heart or lungs which results in veno-arterial shunting and desaturation of arterial blood
- Any structural or physiological defect (and/or its consequences) which requires the use of cardiotonic or vasoactive agents for compensation of cardiac reserve and for control.
2.2.5 Hypertension

Uncontrolled hypertension is disqualifying. A systolic pressure of 150 mm Hg and/or diastolic pressure of 90 mm Hg are the upper limits acceptable, but the applicant's age and sex should also be considered. If either or both the systolic or diastolic pressure repeatedly exceed(s) these limits, the applicant's blood pressure is not acceptable, even if on treatment. (These values accord with recommendations of the National Heart Foundation of Australia). Investigations by 24 hour ambulant blood pressure monitoring may assist diagnosis of borderline cases.

Controlled (adequately treated) hypertension is allowable at all levels of licence provided that there is:

- No significant end organ damage
- Satisfactory ECG
- No adverse drug side effects.

**Acceptable Medication**

Most modern antihypertensive agents are acceptable for control of hypertension in aircrew, provided the applicant is established on the medication and has exhibited no adverse side effects from the drug(s).

The applicant must not pilot any aircraft or actively control air traffic following the commencement of antihypertensive therapy or of a changed treatment regimen until such time as there are no significant side effects from medication and, in any event, not within one week of the commencement of therapy or change in medication. Preferred drugs include diuretics, ACE inhibitors, calcium channel blockers, prazosin angiotensin II antagonists and beta-blockers. Particular care should be taken with use of antihypertensive medications by aerobatic pilots, because of the reduction in G-tolerance produced by these agents.
2.2.6 Ischaemic Heart Disease

Technical Specifications of Investigative Procedures Required in these Protocols

Stress Electrocardiogram

1. Bruce protocol with a 12 lead ECG, with monitoring for at least six (6) minutes after cessation of exercise.

2. Applicant to reach at least 85% of predicted heart rate and at least nine minutes on the Bruce protocol or equivalent on the bicycle ergometer (maximum predicted heart rate = 220 beats per minute minus applicant’s age in years for men, 200 beats per minute minus applicant’s age in years for women).

3. Treadmill exercise is preferred but bicycle exercise is acceptable if the applicant is unable to perform on the treadmill.

4. Applicant should have been continuously in the time zone where testing is performed for at least 72 hours prior to the test.

5. Applicants should normally cease taking any beta-blocker 48 hours prior to the stress test, unless the medication is used to treat known ischaemic heart disease or a significant arrhythmia.

   When a beta-blocker is not so ceased prior to stress testing an applicant, an explanation of the reason is required from the treating or investigating cardiologist who supervises the stress test.

6. All reports of stress tests should include the following details:
   - duration of exercise (with comment if less than nine minutes);
   - level of perceived exhaustion of the applicant; and
   - any symptoms experienced by the applicant.

7. A positive stress electrocardiogram is defined by 1.0 mm or more of horizontal or down sloping ST segment depression at 0.08 sec after the J point.

8. A positive stress ECG is of adequate diagnostic validity if recorded when an applicant’s exercise capacity, heart rate and blood pressure responses reach at least 85% of predicted for age, sex, height and weight, and where the ST segment shift is consistent with ischaemia.

Note: A rise of more than 20 mm in systolic blood pressure response is expected. If the applicant returns a positive stress ECG with ST changes before reaching 85% of designated criteria, it is a matter of even greater aeromedical concern. Exercise electrocardiograms are a screening test for the presence of Ischaemic Heart Disease (IHD) but do not provide conclusive evidence of the presence of IHD. Applicants need not refrain from exercising privileges simply because they are required to undertake a stress ECG.
9. If an applicant is unable to reach nine minutes or equivalent on stress ECG then a gated heart pool scan and cardiologist’s opinion may be acceptable alternatives. In these circumstances, the reason for ceasing the test must be stated.

10. In appropriate circumstances (eg severe arthritis), pharmacological stress testing may be substituted. This should be discussed with CASA Aviation Medicine Section before it is undertaken.

11. The physician supervising the investigation should report exercise ECGs. Computer reporting of exercise ECGs is not acceptable to CASA.

**Stress Echocardiogram**

1. To be performed by an experienced laboratory, using standard recognised protocol, because of possible difficulty with interpretation.

2. Aim should be to achieve 85% of predicted heart rate, as for stress electrocardiogram, without developing any symptoms or signs of myocardial ischaemia.

3. For applicants undergoing pharmacological stress echocardiography using sympathomimetic stressors, atropine may be administered following the maximal dose of dobutamine.

4. A positive stress echocardiogram is defined by severe or extensive new wall motion abnormalities, horizontal or down sloping ST segment depression > 1mV at 0.08 seconds after the J point compared with baseline; new ST segment elevation >0.1mV in applicants without a previous myocardial infarction, or significant tachyarrhythmia. Applicants who have a positive stress Echocardiogram should not exercise privileges until their cardiac status is clarified.

5. If an applicant is unable to achieve 85% of predicted heart rate or if the test is terminated for other reasons, the reasons for ceasing the test must be stated.

**Stress Nucleotide (Thallium or Sestimibi) Scan**


2. Bruce protocol stress to a minimum of 85% of predicted maximal heart rate and at least nine minutes exercise time.

3. Applicant should have been continuously in the time zone where testing is performed for at least 72 hours prior to the test.

4. Applicant should continue to take his/her usual medication(s) until tested.

5. Re-injection or 24 hour view if defects are present. This additional requirement may be omitted if the defect(s) is/are demonstrated to be non-reversible.
6. A satisfactory exercise nucleotide scan is recorded when the exercise or nucleotide scanning does not reveal defects consistent with myocardial ischaemia. Applicants who have a positive stress radio nucleotide scan should not exercise privileges until their cardiac status is confirmed.

**Coronary Angiogram**

1. The angiogram is to demonstrate all major vessels, their tributaries, and grafts if present.
2. Left ventriculogram should be performed.
3. A significant stenosis is considered to be present if there is greater than 50% narrowing of any artery.
4. A satisfactory coronary angiogram is recorded when there is no significant stenosis seen in the native coronary circulation and/or where coronary artery bypass grafts appear without discernible wall pathology or have only minor irregularities.

**Gated Blood Pool Scan**

1. Measurement of the ejection fraction gated heart pool scan may be required for Class 1 and 3 Medical Certificates.
2. The scan should show an ejection fraction greater than 45%.
3. Measurement of the ejection fraction by echocardiogram is permitted for Class 2 Medical Certificates.

**Electron Beam Computed Tomography and ‘Calcium Scores’**

1. Aviation Medicine is considering the potential use of this technology. However, in common with other regulators, it does not currently accept the results of these investigations as substitutes for any other required tests.

**Cardiologist’s Assessment**

This is to include recording of:

1. Clinical status.
2. Control of risk factors, including smoking and obesity.
3. Hyperlipidemia, hypertension, or diabetes mellitus.
4. A satisfactory gated heart pool scan, which should demonstrate no wall motion abnormalities associated with moderate hypokinesis.
5. An overall ejection fraction greater than 45%.
6. An acceptable fasting lipid profile, where total cholesterol is less than 5.5 mmol/L and the HDL fraction is greater than 1.0 mmol/L. Note that both HDL and LDL fractions should be recorded.

**Cardiologist’s Review**

This is to include recording of:

1. Clinical status.
2. Control of risk factors, including smoking and obesity.
3. Hyperlipidemia, hypertension, or diabetes mellitus.
4. An overall ejection fraction greater than 45%.
5. An acceptable fasting lipid profile, where total cholesterol is less than 5.5 mmol/L and the HDL fraction is greater than 1.0 mmol/L. Note that both HDL and LDL fractions should be recorded.

**Issue of Aviation Medical Certificate Following Myocardial Infarction**

**Class 1 or 3 Medical Certificates**

Following the infarction, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months after the event.

**Recertification**

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).
- Gated ejection fraction estimation
- Coronary angiogram, unless this has already been undertaken and reported as satisfactory.

If all of the above investigations are satisfactory, the subject may be recertificated for six months without restriction (Class 1) or nine months without restriction (Class 3).
Subsequent Reviews

12 months post myocardial infarction:
- Routine aviation medical examination
- Cardiologist’s review
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

At six-monthly intervals thereafter:
- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.

At two-yearly intervals thereafter:
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

Class 2 Medical Certificate

Following the infarction, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months after the event.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s review
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).
- Gated ejection fraction estimation.

If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction.

Subsequent Reviews

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG and report.

Five-yearly:
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).
2.2 Cardiology

**Issue of Aviation Medical Certificate Following Coronary Artery Bypass Graft (CABG).**

**Class I or 3 Medical Certificates**

Following the graft, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months after the surgery for Class 1 or for three months after the surgery for Class 3.

**Recertification**

Investigations required for recertification are:
- Routine aviation medical assessment
- Cardiologist’s assessment
- Stress nucleotide scan
- Gated ejection fraction estimation.

If all of the above investigations are satisfactory, the subject may be recertificated for six months without restriction (Class 1) or for nine months without restriction (Class 3).

**Subsequent Reviews**

12 months post coronary artery bypass graft:
- Routine aviation medical examination
- Cardiologist’s review
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

At six-monthly intervals thereafter:
- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.

At two-yearly intervals thereafter:
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

**Note:** Angiography is no longer routinely required each 5 years, but may be required if an applicant develops new symptoms or other evidence suggesting worsening IHD despite treatment.
Class 2 Medical Certificate

Following the graft, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months after the surgery.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG and report.

Five-yearly:

- Stress nucleotide scan or stress echocardiogram.

Issue of Aviation Medical Certificate Following Coronary Artery Angioplasty

Class I and 3 Medical Certificates

Following angioplasty, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months post angioplasty for Class 1, three months post angioplasty for Class 3. While preliminary data suggests that drug-eluting starts may reduce the incidence of post angioplasty stenosis, CASA is not prepared to reduce the six-month post treatment period at this time. CASA will continue to monitor this issue.
Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram)
- Gated blood pool scan.

If all of the above investigations are satisfactory, the subject may be recertificated for six months without restriction (Class 1) or for nine months without restriction (Class 3).

Subsequent Reviews

12 months post angioplasty:

- Routine aviation medical examination
- Cardiologist’s review
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

At six-monthly intervals thereafter:

- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.

At two-yearly intervals thereafter:

- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

**Note:** Angiography is no longer routinely required each 5 years, but may be required if an applicant becomes symptomatic or has other evidence suggesting worsening HID despite treatment.
Class 2 Medical Certificate

Following the angioplasty, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months post angioplasty.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram)
- Gated ejection fraction estimation.

If all of the above investigations are satisfactory, the subject may be recertificated for six months without restriction.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.

Five-yearly:

- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

Issue of Aviation Medical Certificate Following Evidence of Ischaemic Heart Disease

Class I or 3 Medical Certificates

When an applicant presents with:

- Ischaemic heart disease symptoms such as angina, arrhythmia; or
- Cardiac failure or other evidence of ischaemic heart disease, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.
Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram)
- Gated heart pool scan or ejection fraction by radio nucleotide scan.

If the stress nucleotide scan or stress echocardiogram is positive, proceed to an angiogram.

If all investigations up to and including the stress nucleotide scan or stress echocardiogram are negative, the subject may be recertificated.

If the stress nucleotide scan or stress echocardiogram is positive but a subsequent angiogram is reported as satisfactory, the applicant may be recertificated for six months.

Subsequent Reviews

At six-monthly intervals thereafter:

- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.

At two-yearly intervals thereafter:

- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

Class 2 Medical Certificate

When an applicant presents with:

- Ischaemic heart disease symptoms such as angina, arrhythmia; or
- Cardiac failure or other evidence of ischaemic heart disease, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.
Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Stress ECG.

If the stress ECG is negative, the subject may be recertificated without restriction.

If the stress ECG is positive, proceed to a stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

If the stress nucleotide scan is or stress echocardiogram is negative, the subject may be recertificated.

If the stress nucleotide scan or stress echocardiogram is positive, proceed to an angiogram.

Subsequent Reviews

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- Stress ECG.
2.2.7 Valvular Heart Disease

**Uncorrected Aortic Incompetence**

**Class 1 and 3 Medical Certificates**

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

**Recertification**

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist reports are satisfactory, the applicant may be recertificated for a period of one year (class 1 applicants) or two years (class 2 applicants).

**Subsequent Reviews**

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- ECG.
Class 2 Medical Certificate

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist reports are satisfactory, the applicant may be recertificated for a period of two years.

Subsequent Reviews

- Two-yearly review by cardiologist.

Corrected Aortic Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.
Where a tissue valve is used and there is no requirement for anticoagulation and certification may be unrestricted.

Where a mechanical valve is used, the applicant is to have evidence of clinically satisfactory, well-controlled anticoagulation and Class 1 medical certification will be restricted to multi-crew operations.

**Subsequent Reviews**

Classes 1, 2 and 3 require yearly review by a cardiologist.

**Uncorrected Aortic Stenosis**

**Class 1, 2 and 3 Medical Certificates**

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

**Recertification**

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Electrocardiogram
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and the cardiologist’s report are satisfactory, the applicant may be recertificated for a period of 12 months.

**Subsequent Reviews**

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram
- Chest X-ray.
Corrected Aortic Stenosis

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and the cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.

Where a tissue valve is used and there is no requirement for anticoagulation, medical certification may be unrestricted.

Where a mechanical valve is used, the applicant is to have evidence of clinically satisfactory well-controlled anticoagulation, and Class 1 medical certification will be restricted to multi-crew operations.

Subsequent Review

Class 1, 2 and 3 all require annual review by a cardiologist.
Uncorrected Mitral Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months without restriction.

Subsequent Reviews

For **Class 1 and 3 Medical Certificates**, at annual intervals thereafter:

- Routine aviation medical examination
- ECG
- Cardiologist’s review.

For **Class 2 Medical Certificate**, at two-yearly intervals thereafter:

- Routine aviation medical examination
- Cardiologist’s review.
Corrected Mitral Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Doppler echocardiogram.

If the valve is replaced, a significant risk of embolism remains, particularly where a mechanical valve implant has been used.

For mechanical valves, Class 1 applicants will be assessed as unfit. If reports are favourable, Class 2 applicants may be recertificated for 12 months restricted to “as or with qualified co-pilot only” and Class 3 applicants may be recertificated for 12 months, with appropriate restrictions. Assessments will not be made until at least six months post surgery.

For tissue valves, if reports are satisfactory, all classes of applicants may be recertificated. For Class 1, recertification will be for up to six months only and will be restricted to operation “as or with qualified co-pilot only”. For Class 2, recertification will be possible for up to 12 months and will be restricted to operations “as or with qualified co-pilot only”. For Class 3, recertification will be possible for up to 12 months with appropriate restrictions. Assessments will not be made until at least six months post surgery.

For valve repairs, if reports are favourable, Class 1 applicants may initially be recertificated for six months, and Class 2 and Class 3 applicants may be recertificated for 12 months.

Subsequent Reviews

Valve Replacements:

- For Class 1: Six-monthly routine aviation medical examination. All applicants require cardiologist’s review with Doppler echocardiogram.

- For Classes 2 and 3: Annual routine aviation medical examination. All applicants require cardiologist’s review with Doppler echocardiogram.
Valve Repairs:

All applicants require a routine annual aviation medical examination and cardiologist’s review with Doppler echocardiogram.

Uncorrected Mitral Stenosis

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

Applicants with mild uncorrected mitral stenosis (where the valve area is greater than 1.5 cm², the heart is in sinus rhythm, where there is no history of atrial fibrillation and the left atrial diameter is less than 4.5 cm), are permitted recertification for 12 months.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- ECG.
Corrected Mitral Stenosis

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA. This will not be considered until at least three months following mitral valvotomy or replacement.

Recertification

Investigations required for recertification following mitral valvotomy are:

- Routine aviation medical examination
- Cardiologist’s assessment, which is to include assessments of the incompetence and stenosis
- Doppler echocardiogram
- ECG
- Chest X-ray.

If all of the investigations and cardiologist’s reports are satisfactory following mitral valvotomy, the applicant may be recertificated for a period of 12 months.

Following mitral valve replacement.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Doppler echocardiogram
- ECG
- Chest x-ray.

Following mitral valve replacement, Class 1 applicants will be assessed as unfit because of the increased risk of embolism. If reports are favourable, Class 2 applicants may be recertificated for 12 months, restricted to operation “as or with qualified co-pilot only” and Class 3 applicants may be recertificated for 12 months, with appropriate restrictions.
Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram.
2.2.8 Bundle Branch Blocks

**Partial or Complete Left Bundle Branch Block (Not Including Left Anterior Hemiblock)**

**Class 1, 2 & 3 Medical Certificates**

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

**Recertification**

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan
- Doppler echocardiogram
- Left ventricular gated blood scan to measure ejection fraction
- 24 hour Holter monitor recording.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for 12 months.

**Subsequent reviews**

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review.

If reports continue to be completely satisfactory for five years, applicants may then be recertificated without restriction.

**Incomplete Right Bundle Branch Block**

No specific requirements.
Complete Right Bundle Branch Block

Class 1, 2 and 3 Medical Certificates

Note: This may be a normal variant in young applicants. A cardiologist’s opinion should be obtained in these cases.

Otherwise, on diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Echocardiogram
- Stress ECG.

If all of the investigations and cardiologist's reports are satisfactory, the applicant may be recertificated for the maximum period permitted for the relevant medical certificate.

Left Anterior Hemiblocks

Class 1, 2 and 3 Medical Certificates

If this is a newly acquired condition, a stress ECG should be performed. If this is normal, there is no requirement for further reviews.

Atrio-Ventricular Blocks

First Degree

No specific requirements.

Second Degree — Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.
Recertification
Investigations required for recertification are:
- Cardiologist’s assessment
- 24 hour Holter monitor recording
- Stress ECG.

If all of the investigations and cardiologist's reports are satisfactory, the applicant may be recertificated for 12 months. Applicants with untreated heartblocks of 2:1 or greater will not be recertificated for any class of medical certificate.

Subsequent Reviews
An annual ECG is required.

Third Degree Heart Block
Restricted certification may be available with the use of pacemakers.

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification
Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Stress ECG (to assess cardiac function)
- 24 hour Holter monitor recording.

Note: The pacemaker is to be dual chambered with bipolar leads. The pacemaker is to have a technical check every 12 months, with the outcome reported to the Aviation Medicine Section.
Recurrent Atrial Fibrillation

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment, with particular reference to history and presence of any congenital abnormalities
- ECG
- 24 hour Holter monitor
- Exercise echocardiogram
- Biochemical profile, including: thyroid function studies, liver function studies, serum magnesium and potassium levels, Fasting Blood Glucose.
- Haemoglobin estimation.

If drug treatment is required, there must be adequate rate control (as assessed by a cardiologist), without significant side effects. There should be no underlying structural heart disease. In these circumstances, all applicants may be recertificated for 12 months without restriction, unless prescribed warfarin. Where Warfarin is prescribed, CASA will require evidence of good INR control.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review.
Atrial Flutter

Class 1, 2 and 3 Medical Certificates

On diagnosis the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist's assessment, with particular reference to history and to presence of any congenital abnormalities
- 24 hour Holter monitor
- Exercise echocardiogram
- Biochemical profile, including: thyroid function studies, liver function studies, serum magnesium and potassium levels, Fasting Blood glucose
- Haemoglobin estimation.

If drug treatment is required, there must be adequate rate control (as assessed by a cardiologist), without significant side effects. There should be no underlying structural heart disease. In these circumstances, all applicants may be recertificated for 12 months without restriction, unless prescribed warfarin.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist's review.
Wolff-Parkinson-White Syndrome

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Electrophysiological studies.

If WPWS is confirmed, the applicant is assessed as unfit until radiofrequency ablation of aberrant conduction pathways has been performed and the treating cardiologist has certified that conduction has been normalised. All applicants may then be recertificated for six months without restriction.

Subsequent Reviews

At six months, 12 months and 24 months post successful radiofrequency ablation of aberrant conduction pathways, the following are required:
- Routine aviation medical examination
- Cardiologist’s review.

If there is no recurrence of abnormal conduction within 24 months of successful radiofrequency ablation, further recertification without restriction should follow the normal pattern for the applicant’s age and class of medical certificate.

Corrected Congenital Heart Anomalies

In many cases, residual haemodynamic defects may preclude medical certification at any level for these applicants. Each case will be dealt with on its individual merits. A comprehensive cardiological work-up and report should be completed and full details forwarded to Aviation Medicine Section for assessment.

Other Cardiological Abnormalities

These can be extremely varied and range from trivial conditions to those which absolutely preclude medical certification at any level for these applicants. Each case will be dealt with on its individual merits. A comprehensive cardiological work-up and report should be completed and full details forwarded to Aviation Medicine Section for assessment.
2.2.9 Cardiomyopathies

Dilated Cardiomyopathy

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Two recordings of 24 hours Holter monitor studies
- Gated blood pool scan.

If ejection fraction is greater than 45% with no symptoms and a normal Holter monitor report, then a special Class 1 Certificate, restricted to multi-crew operations, on a planned six-monthly renewal assessment basis, may be allowed.

For Class 2 and 3 applicants who meet the same criteria, unrestricted certification for six months at a time may be allowed.

Subsequent Reviews

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<th>Six-monthly cardiologist’s review with gated blood pool scan</th>
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<tr>
<td>Classes 2 and 3</td>
<td>Unrestricted certification may be issued, with six monthly cardiologist’s review.</td>
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</table>

In all cases, if investigations/assessments are completely normal on five consecutive occasions, the applicant may thereafter be recertificated on the basis of meeting routine medical requirements, without additional assessments.
Hypertrophic Cardiomyopathy

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA. Recertification will not normally be possible for Class 1 or 3, but all cases will be assessed on their individual merits.

Recertification

In all cases, further certification will be appropriately restricted.

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment, including detailed family history
- Stress ECG
- Doppler echocardiogram
- 24 hour Holter monitor recording.

If all of the investigations and the cardiologist’s report are satisfactory, recertification may be available.

Subsequent Reviews

Requirements will be individually determined and notified.
2.2.10 Cardiac Transplant

Class 1 applicants will be assessed as unfit.

Class 2 and 3

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are.
- Routine aviation medical examination
- Cardiologist’s assessment
- Coronary angiogram (for detection of atherosclerosis)
- 24 hour Holter monitor recording
- Doppler echocardiogram.

If all of the investigations and the cardiologist’s report are satisfactory, Class 2 and Class 3 applicants may be recertificated on an individually determined basis.

Subsequent Reviews

At six-monthly intervals:
- Routine aviation medical examination
- Cardiologist’s review.

At annual intervals:
- Stress nucleotide scan
- Coronary angiogram (to assess coronary atherosclerosis)
- Doppler echocardiogram.
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2.3.1 Introduction

This section details the assessment procedures for pilots, other aircrew members and air traffic controllers who suffer or who may suffer from lung or respiratory system disease.

The aim of the respiratory assessment within the aeromedical examination is to ensure that applicants do not suffer from lung or respiratory system disease which places them at an unacceptable risk of incapacitation, or which may otherwise jeopardise the safety of air navigation.

2.3.2 The Respiratory Standard – CASR Part 67

CASR 67
The respiratory standards are found in the following paragraphs of CASR Part 67:

<table>
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<th>CASR 67.155</th>
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<td>Table 67.155</td>
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<th>For medical standard 3</th>
<th>CASR 67.160</th>
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<td>Table 67.160</td>
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2.3.3 Assessment

All applicants for Australian aviation medical certificates are administered a comprehensive screening questionnaire physically examined by a DAME, and required to undertake a number of screening tests.

When conducting the respiratory component of the aeromedical examination, the DAME should note the presence of relevant risk factors for the development of lung and respiratory system disease and the presence of signs and symptoms suggestive or diagnostic of such conditions.

For example: risk factors for the development of asthma include:

- Family history of asthma
- Personal or family history of smoking
- Other allergies or atopic symptoms.
FEV₁ is measured at the original assessment and each renewal assessment. (Note spirometers should be calibrated to BTPS). Chest X Rays may be required if the applicant’s history or physical signs so indicate. This is likeliest in smokers or ex-smokers. Routine Chest X Ray is not required.

Further investigation of respiratory abnormalities may include flow loop spirometry, measurement of diffusion capacity, blood gas estimation (both at ground level and at simulated altitude) and various forms of imaging of the respiratory system.

Referral to a consultant respiratory physician may be required to confirm a diagnosis or to resolve concern over a differential diagnosis. CASA may also require an applicant for medical certification to be assessed by a consultant respiratory physician as part of its consideration of an applicant’s fitness for aeromedical certification.

### 2.3.4 Documentation of Respiratory Conditions

Many respiratory conditions are principally diagnosed and classified on the basis of history. DAMEs should take a careful and thorough clinical history before reaching a respiratory diagnosis, particularly a diagnosis that may significantly affect an applicant’s employment prospects. Particular attention must be paid to chronic use of any medications that are incompatible with the exercise of the privileges of licensure. Also see Section 2.13 Medication – Drugs and Flying/Controlling.

### 2.3.5 Asthma

**Diagnosis and assessment**

In the first instance care should be taken to ensure an accurate diagnosis of asthma, noting that the criteria of recurrent, reversible airways obstruction should be met. Subsequent assessment of asthma should distinguish between severity and control. Severity is in part determined by the amount of treatment required to maintain control (as evidenced by type and quantity of prescription or over-the-counter medications required to control asthma symptoms, the requirement for oral steroid medication and the number of Emergency Room presentations or hospital admissions due to asthma). CASA will not usually certificate applicants who suffer from severe asthma. Uncontrolled asthma, regardless of severity, is not acceptable in the aviation environment, and will preclude the issuing of any class of CASA medical certificate.

Applicants who have asthma which is well controlled (if necessary using anti-inflammatory therapy) may be eligible for any class of medical certificate. Applicants with mild well controlled asthma maybe required to undergo periodic spirometry. In the case of applicants with moderate well controlled asthma, periodic assessment by a respiratory physician may be required. CASA will notify specific requirements on a case-by-case basis.
**Asthma severity**

**Severe asthma**

Applicants with severe asthma experience continuous symptoms, limited physical capacity, and have a FEV₁ or peak flow measurement of less than or equal to 60% predicted. Peak flow variability may be greater than 30%. Treatment requirements of patients with severe asthma will likely include moderate or high doses of inhaled corticosteroid, with or without long-acting beta-agonist, oral theophylline, or inhaled anticholinergic. Some applicants may require oral corticosteroid. Patients with severe asthma may require care through hospital Emergency Rooms or even hospital admission when control of the condition is poor.

**Moderate asthma**

Applicants with moderate asthma generally have symptoms of airflow obstruction most of the time, and experience some impairment of physical capacity. Their FEV₁ or peak flow will be in the range 60-80% predicted, and peak flow variability may be greater than 15%. Treatment requirements will likely include low to moderate doses of inhaled corticosteroid, (e.g. beclomethasone 400-1000 micrograms per day or equivalent).

**Mild asthma**

Applicants with mild asthma generally have intermittent symptoms, interposed between symptom-free intervals that may be prolonged. FEV₁ and peak flows are often normal, and there may be no peak flow variability.

**Asthma control**

For CASA’s purposes, good control requires that, in the three months preceding assessment, the applicant:

- Has experienced no or minimal cough, wheeze or breathlessness on exercise or during the night
- Has maintained "best" pulmonary function
- Has maintained stable exercise capacity, although possibly somewhat impaired
- Has not required treatment with oral corticosteroid
- Has not required an Emergency Room visit/hospital admission for symptoms of asthma.
2.3.6 Chronic Bronchitis and Emphysema

Smokers aged 45 or more should undergo increased screening for these conditions for all classes of medical certificates. Positive findings dictate a full respiratory assessment, including a report by a respiratory physician. It is unlikely that applicants with severe chronic bronchitis or emphysema will meet the medical standard for issue of a class 1 medical certificate. However, restricted class 2 and 3 certification may be possible, on a case-by-case basis.

2.3.7 Pneumothorax

Traumatic Pneumothorax.

Medical certification for all classes is usually possible after review of medical reports covering precipitating factors, associated problems, extent of recovery and subsequent lung function. Full assessment by a respiratory physician may be required.

Single Spontaneous Pneumothorax.

An applicant who has had a spontaneous pneumothorax with full recovery and no obvious cause nor likelihood of recurrence may be assessed as fit for all classes of medical certification.

Recurrent Spontaneous Pneumothorax.

An applicant with recurrent spontaneous pneumothorax (defined as two or more episodes on the same side) is not usually acceptable for any class of medical certificate. If the pneumothorax has been surgically corrected by pleurodesis (mechanical or chemical) or pleurectomy, the applicant may be assessed as fit. Assessment by a respiratory physician may be required.

2.3.8 Pulmonary Tuberculosis

An applicant with active tuberculosis (but not open tuberculosis) may be medically certificated for any class provided there is adequate evidence that he/she is on appropriate therapy and there is no evidence of side effects from the therapy. Applicants with fully treated pulmonary tuberculosis should be aero medically assessed to determine the extent of lung damage/recovery. Assessment by a respiratory physician is required in all cases.
2.3.9 Sarcoidosis

Sarcoidosis is usually acceptable for all classes of medical certification, provided myocardial and other system sarcoidosis has been excluded. Reports of full cardiovascular and respiratory assessments are required.

2.3.10 Pulmonary Embolism

An applicant who develops pulmonary embolism must be comprehensively investigated to determine if there are significant underlying reasons for the episode. Once recovery is complete and the applicant demonstrates normal pulmonary function (including normal blood gases), unrestricted medical certification at any class is usually possible. CASA will not usually consider re-certification until at least 8 weeks after the episode. Pilots who are prescribed long-term anticoagulation with warfarin following a pulmonary embolism may be granted conditional certification.

2.3.11 Fibrosing Lung Diseases

Applicants with these conditions require full respiratory assessment, including blood gas estimation. Thereafter, certification may be possible on a case-by-case basis.

2.3.12 Obstructive Sleep Apnoea (OSA)

This condition is often under-reported because applicants fear loss of certification. DAMEs must specifically inquire whether or not the applicant has conditions that suggest OSA eg, loud habitual snoring, witnessed apnoea. Where the diagnosis is entertained, the Epworth Sleepiness Scale must be administered to the applicant. If the resulting score is 16 or more, assessment by a sleep physician is required. Following definitive diagnosis of OSA, unrestricted medical certification at all classes is usually possible after appropriate corrective treatment has been instituted and demonstrated to be successful. This usually requires reports from a sleep physician, before and after treatment.

Also see ‘Sleep Disorders’ in Section 2.6.17 (Psychiatry).

The Epworth Sleepiness Scale provides an estimate of the likelihood of dozing or falling asleep, in contrast to just feeling tired.

Applicants suspected of suffering from OSA should be questioned about their sleepiness during normal activities. (Even if the applicant has not recently undertaken some of these activities, they should be asked to estimate their relevant chance of dozing based on prior experiences).
Use this scale to allocate scores under 'chance of dozing' in each situation described.

0 = no chance of dozing
1 = slight chance of dozing
2 = moderate chance of dozing
3 = high chance of dozing

<table>
<thead>
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<th>Situation</th>
<th>Chance of dozing</th>
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<tbody>
<tr>
<td>Sitting and reading</td>
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<tr>
<td>Watching television</td>
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<tr>
<td>Sitting inactive in a public place (e.g. a cinema or meeting)</td>
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<tr>
<td>As passenger in a car for &gt; 1 hour</td>
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<tr>
<td>Lying down to rest in the afternoon when circumstances permit</td>
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<tr>
<td>Sitting and talking to a companion</td>
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<tr>
<td>Sitting quietly after an alcohol-free lunch</td>
<td></td>
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<tr>
<td>In a car, while stopped briefly in heavy traffic</td>
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<tr>
<td><strong>Total Epworth Sleepiness Score</strong></td>
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</tbody>
</table>

If the score is 16 or more, assessment by a sleep physician is required.

(The Epworth Sleepiness Scale is reproduced with the permission of Dr M.W. Johns, A new method for measuring daytime sleepiness: the Epworth sleepiness scale. Sleep, 14(6):540-545.)
2.4.1 Introduction

This section details the assessment of pilots, other aircrew members and air traffic controllers who suffer or who may suffer from endocrine disease or from metabolic disorders.

The aim of the endocrine assessment within the aeromedical examination is to ensure that applicants do not suffer from endocrine or metabolic conditions which place them at an increased risk of incapacitation or which may produce a decrement in physiological or psychological function sufficient to jeopardise the safety of air navigation. In conducting the aeromedical examination, the DAME will recognise that an individual who holds an unrestricted medical certificate must be capable of performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities may include flight (either as a private or professional pilot):

- For prolonged duration, often as part of a shift roster
- Subject to disrupted sleep and time zone changes
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning

A number of these stressors may also affect Air Traffic Controllers.
2.4.2 The Endocrine Standard – CASR Part 67

The endocrine standards are found in the following paragraphs of CASR Part 67:

For Medical Standard 1:

- CASR 67.150
- “A person suffering from diabetes mellitus may be assessed as meeting medical standard 1 if the condition is satisfactorily controlled without the use of any anti-diabetic drug.”

For Medical Standard 2:

- CASR 67.155
- “A person who suffers from diabetes mellitus may be assessed as meeting medical standard 2 if:
  a. The condition is satisfactorily controlled without the use of any anti-diabetic drug; or
  b. If an oral anti-diabetic drug is used to control the condition:
     i. The condition is under on-going medical supervision and control; and
     ii. The oral drug is approved by CASA.”

For Medical Standard 3:

- CASR 67.160
- “A person who suffers from diabetes mellitus may be assessed as meeting medical standard 3 if:
  a. The condition is satisfactorily controlled without the use of any anti-diabetic drug; or
  b. If an oral anti-diabetic drug is used to control the condition:
     i. The condition is under on-going medical supervision and control; and
     ii. The oral drug is approved by CASA.”
2.4.3 Assessment of the Endocrine System

All applicants for Australian aviation medical certificates are required to complete a comprehensive screening questionnaire, to be physically examined by a DAME, and to undertake urinalysis for the presence of urinary glucose. In addition, applicants for Class 1 and Class 3 medical certificates are required to undergo fasting blood glucose estimation at the same time as they undergo five-yearly fasting lipid estimation. (CASA intends to introduce a requirement that applicants for Class 2 medical certificates will also be screened five yearly for diabetes mellitus by means of fasting blood glucose estimation).

When conducting an aeromedical examination, the DAME should note the presence of relevant risk factors for the development of endocrine or metabolic diseases and the presence of signs and symptoms suggestive or diagnostic of such conditions. Where such an endocrine condition is confirmed, evidence of secondary pathology or of accompanying complications should be sought and documented.

For example, risk factors for the development of diabetes mellitus include:

- Ethnic group
- Age >55 years
- Positive family history
- Obesity or significant overweight
- Abnormality of glucose tolerance
- Pregnancy
- Hypertension, dyslipidaemia, or clinical macrovascular disease
- Lack of regular exercise
- Use of diabetogenic medications.

Evidence of pathology secondary to diabetes mellitus may include vascular disease, retinal disease or renal disease.
2.4.4 Diabetes Mellitus and Impaired Glucose Tolerance

The incidence and prevalence of diabetes mellitus (of all types) has increased considerably in Australia in recent years. Up to 7.5% of the population now meets the diagnostic criteria for the condition (see Biochemical Investigations below). This is significant for aviation safety as diabetes mellitus is disqualifying for certification for aviation and air traffic control duties. The major aeromedical risk of diabetes relates to incapacitation (either overt or subtle), while it is also a major independent risk factor for a number of other incapacitating conditions—for example, stroke, acute myocardial infarction.

However, there is provision in the Civil Aviation Regulations for ‘a person who suffers from diabetes to be assessed as meeting the medical standard if the approved person conducting the relevant examination is satisfied that the diabetes is satisfactorily controlled without the use of an anti-diabetic drug’ or, for Class 2 and 3 medical certificate applicants, ‘where an oral anti-diabetic drug (approved by the Director of Aviation Medicine) is used to control the condition, the person provides evidence that he or she is undertaking on-going supervision and control of the condition’.

Classification of Diabetes Mellitus

Diabetes/diabetes precursor conditions are conventionally classified into four major types:

- Type 1 (absolute reduction in insulin production)
- Type 2 (resistance to the effects of insulin)
- Gestational
- Impaired glucose tolerance/impaired fasting glycaemia.

The majority of Type 1 diabetes mellitus sufferers use insulin regularly to manage the condition. Sufferers of Type 2 diabetes mellitus utilise a variety of management strategies: diet, oral hypoglycaemic agents and insulin, either singly or in combination.

Approximately one third of patients diagnosed with impaired glucose tolerance will subsequently have their glucose biochemistry return to normal, one third will continue to have impaired glucose tolerance and the remainder will eventually become sufferers of frank diabetes. Of aeromedical concern is the finding that all persons with impaired glucose tolerance have a statistically significant increase in their risk of developing ischaemic cardiovascular disease.
Biochemical Investigations

For medical certification purposes, any clinical suspicion of diabetes mellitus (such as urinalysis showing the presence of glycosuria) should be confirmed biochemically.

CASA recognises the following biochemical criteria, documented on at least two separate days, as confirming the diagnosis of diabetes mellitus:

- Fasting venous plasma glucose >6.9 mmol/l (less than 5.5 mmol/l—diabetes unlikely)
- Casual (random) venous plasma glucose >11.1 mmol/l (less than 5.5 mmol/l—diabetes unlikely).

Equivocal results of a fasting venous plasma glucose or casual venous plasma glucose estimation (between 5.5 and 6.9 mmol/l fasting or between 5.5 and 11.0 mmol/l casual) may indicate impaired glucose tolerance. In the event of an equivocal blood glucose result, DAMEs should order a 75 gram oral glucose tolerance test performed according to WHO 1999 guidelines and assessed according to the criteria in Table 2.4-1.

Table 2.4-1: WHO oral glucose tolerance test assessment criteria 1999

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Criteria—Venous plasma Glucose concentration (mmol/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes mellitus</td>
<td></td>
</tr>
<tr>
<td>• Fasting value</td>
<td>≥7.0 or</td>
</tr>
<tr>
<td>• 2 hr post glucose load</td>
<td>&gt;11.1</td>
</tr>
<tr>
<td>Impaired glucose tolerance</td>
<td></td>
</tr>
<tr>
<td>• Fasting value</td>
<td>&lt;7.0 and</td>
</tr>
<tr>
<td>• 2 hr post glucose load</td>
<td>7.8–11.0</td>
</tr>
<tr>
<td>Impaired fasting glucose</td>
<td></td>
</tr>
<tr>
<td>• Fasting value</td>
<td>6.1–6.9</td>
</tr>
<tr>
<td>• 2 hr post glucose load</td>
<td>&lt;7.8</td>
</tr>
<tr>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>• Fasting value</td>
<td>&lt;6.1 and</td>
</tr>
<tr>
<td>• 2 hr post glucose load</td>
<td>&lt;7.8</td>
</tr>
</tbody>
</table>
Other Investigations

All applicants for medical (re-)certification who have either diabetes mellitus or impaired glucose tolerance must also provide to the DAME the results of all glycosolated haemoglobin (HbA1c) estimations performed in the previous twelve months. A minimum of three estimations is required, with the most recent being performed no more than one month prior to DAME examination. (HbA1c results should be reported in % HbA1c and should indicate the laboratory reference range for the estimations.)

In addition, CASA requires the following information and test results from applicants with diabetes mellitus:

- A recent report (within three months) from an endocrinologist or specialist physician:
  - Current status of control of diabetes
  - Whether the applicant has any history of hypoglycaemia/hyperglycaemia in preceding 12 months.
  - If so, whether there was any requirement for external intervention or assistance.

- A copy of the applicant’s diary of ambulant blood glucose monitoring throughout the three months immediately prior to DAME examination. Desirable ranges are:
  - No readings below 2.8 mmol/litre
  - At least 90% of values between 5.5 mmol/litre and 10 mmol/litre.

- A copy of the applicant’s most recent annual ophthalmological assessment detailing:
  - Clinical status
  - Visual acuity (with and without correction)
  - Presence of retinal disease
  - Presence of other ophthalmic pathology.

- A copy of a recent cardiovascular assessment by a cardiologist or specialist physician, including results of resting ECG and interval Stress ECG. The report should detail:
  - Clinical status
  - Presence and control of risk factors—for example, hypertension, smoking, hyperlipidaemia (total cholesterol, LDL and HDL)
  - Assessed risk of any acutely disabling cardiovascular event.

- The result of recent renal function tests, including 24 hour urine protein excretion.

- Certification that the applicant has completed and understood a course of diabetic management education.

There are no specific requirements for applicants who have impaired glucose tolerance or impaired fasting glycaemia where these conditions have not progressed to frank diabetes mellitus. However, CASA advises DAMEs to counsel affected applicants on the potential aeromedical certification consequences of their progression to frank diabetes mellitus and to initiate or refer them for appropriate clinical management.
Medical Certification of Persons with Diabetes Mellitus

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

Requirements for medical (re-)certification are set out in the following paragraphs.

1. Persons with diabetes mellitus controlled by diet may receive medical certification at Class 1, 2 or 3 provided they meet the following criteria:
   - Evidence of stable blood glucose control:
     - Glycosolated Haemoglobin (HbA1c) taken within one month of assessment <7.5%.
     - Satisfactory reports as detailed under Other Investigations
   - Absence of complications that could result in sudden or subtle incapacitation when exercising the privileges of a licence.

2. Persons with diabetes mellitus controlled by diet and oral hypoglycaemic drug(s) may receive unlimited medical certification at Class 2 or 3 levels only. Such persons who seek Class 1 (re-)certification may be offered (re-)certification with an ‘as or with co-pilot’ restriction. Prior to their (re-)certification, CASA requires objective evidence that these applicants meet the following criteria:
   - No unacceptable side effects from drugs
   - Evidence of stable blood glucose control
     - No episode of symptomatic hypoglycaemia during the preceding 12 months
     - Glycosolated Haemoglobin (HbA1c), taken within preceding month <7.5%
     - Satisfactory reports as detailed in the previous section, Other Investigations
   - Absence of neurological, cardiovascular, ophthalmological, renal or other complications of diabetes mellitus that could result in sudden or unpredictable incapacitation when exercising the privileges of a licence.

3. Persons with diabetes mellitus who require insulin treatment do not meet the mandatory medical standards and are not fit for medical certification. However, in appropriate cases, the Director of Aviation Medicine may exercise discretion and issue a Class 2 medical certificate endorsed with the conditions ‘as or with co-pilot only’ and ‘valid in Australian airspace only’. Prior to such certification, CASA requires:
   - Evidence of stable blood glucose control
     - No episode of symptomatic hypoglycaemia requiring intervention by others in the preceding 12 months
     - Serial Glycosolated Haemoglobin (HbA1c) estimations at two month intervals over the preceding 6 months—all results <7.5%
     - Satisfactory reports as detailed in the previous section, Other Investigations
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2.4 Endocrinology

- Absence of neurological, cardiovascular, ophthalmological or renal complications of diabetes that could result in sudden or unpredictable incapacitation when exercising the privileges of a licence.

Special Glucose Level Monitors

Individuals with diabetes mellitus who receive aeromedical (re-)certification must possess and use a memory chip glucose meter for ambulatory blood glucose monitoring. The meter, together with a readily absorbable source of glucose, must be carried by the applicant while exercising the privileges of a licence. (When real-time ambulatory glucose monitoring becomes readily available in Australia, CASA may require this form of monitoring instead of monitoring with memory chip glucose meters.)

Change in Treatment

When an applicant’s oral hypoglycaemic medication is changed, or when its dosage is changed, he or she must not exercise the privileges of an aviation licence until the attending medical practitioner supervising the medication is satisfied that he or she is again stable and a DAME has recertified his or her fitness in accordance with CASA’s relevant medical standards.

2.4.5 Thyroid Disorders

The major aeromedical concern accompanying thyroid disease is the potential for abnormally high or low levels of thyroid hormone to affect an applicant’s cognitive function. Thyroid tumours have the potential to cause local symptoms or to metastasise to critical locations.

Investigation

Clinical suspicion of thyroid disease should be confirmed by appropriate investigations. These may include various imaging techniques, the use of fine needle biopsy, and biochemical thyroid function studies. CASA requires the results of thyroid function tests to establish that applicants are euthyroid prior to consideration for medical (re-)certification.
Medical Certification of Applicants Suffering from Thyroid Disorders

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. Requirements for medical (re-)certification are set out in the following paragraphs.

Goitre

Persons with goitre are acceptable for medical certification provided that there is no evidence of thyroid dysfunction nor of vascular or airways obstruction.

Hypothyroidism

Persons who are hypothyroid may be medically certificated provided Thyroid Function Tests (TFTs) demonstrate that adequate replacement therapy has been instituted and control maintained. TFTs should be performed annually for the first three years following initial diagnosis and periodically thereafter, as determined on a case-by-case basis, with serial results submitted with requests for medical re-certification.

Hyperthyroidism

Persons diagnosed as suffering from hyperthyroidism may be recertified once they are stable after surgery/isotope treatment/stable on medication and TFTs demonstrate that they are euthyroid. TFTs should be performed annually for the first three years after treatment is instigated and periodically thereafter, as determined on a case-by-case basis, with serial results submitted with requests for medical re-certification.

Thyroid Cancers

Thyroid cancer is disqualifying under Civil Aviation Regulations (1988). Persons diagnosed with thyroid cancer are obliged to refrain from performing licensed duties until they have been reviewed by CASA and a clearance to resume duties has been issued. While prognosis for cancer depends on many factors, in most cases of thyroid cancer CASA will require documentation of successful removal of the tumour, completion of any subsequent radiotherapy, and the absence of metastatic disease before considering an applicant for (re-)certification. Under certain circumstances, conditional certification may be offered to pilots suffering metastatic disease.

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1 These factors include the type of cancer, the stage of disease when discovered, the aggressiveness of the individual cancer, cell type, the types of treatment available, co-existing diseases and the general health of the individual.
2.4.6 Gout/Hyperuricemia

Gout and hyperuricaemia arouse aeromedical concerns because of the potentially incapacitating effect of acute symptomatic gout, and of the potential for high serum levels of uric acid to lead to symptomatic urolithiasis.

**Investigation**

Clinical suspicion of gout/hyperuricaemia should be confirmed by appropriate investigations, which may include estimations of serum uric acid levels and of urinary excretion rate. CASA will require the results of these investigations prior to considering an affected applicant for medical (re)certification. In the event that an applicant with gout suffers from abdominal pain, he/she should be investigated to exclude renal stone.

**Medical Certification of Applicants Suffering from Gout/Hyperuricaemia**

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

CASA will certificate applicants with gout/hyperuricaemia when the condition is satisfactorily controlled (either by diet or by allopurinol) and has been asymptomatic for at least one month. Applicants should not exercise the privileges of a licence when being treated with colchicine.

2.4.7 Hypothalamic and Pituitary Disorders

**Pituitary Adenoma**

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

Persons with pituitary adenoma will be assessed as unfit. Subsequent medical certification will depend on considerations of residual tumour, effects of raised intracranial pressure, any pressure effects on the optic chiasm, the effects of surgery or other treatment, the effects of any hormone excess or deficiency, and the effects of any drug therapy. In some instances, an applicant may be certified with restrictions and appropriate surveillance following special medical assessment. Annual review, including reports from an endocrinologist or specialist physician and from an ophthalmologist, will be required.
**Diabetes Insipidus**

On diagnosis, inform the CASA Aviation Medicine Section and advise the applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

This condition is marked by polyuria resulting from failure of vasopressin secretion. Fluid deprivation tests are diagnostic. Treatment is with vasopressin or one of its analogues. After the treated condition has been stable for a minimum of six months, applicants may be medically certificated with restrictions and appropriate surveillance. All such cases require special medical assessment, and CASA will determine aeromedical certification, when appropriate, on a case-by-case basis.

**2.4.8 Adrenocortical Disorders**

Disorders of adrenocortical metabolism have the potential to incapacitate or impair the ability of a pilot or ATC to perform duties. In addition, the underlying causes of adrenocortical disorders may themselves have significant aeromedical implications.

**Medical Certification of Persons Suffering from Adrenal Disorders**

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

- Aeromedical disposition will depend on cause and nature of adrenal disorder. Each applicant will be considered on a case-by-case basis and full documentation will be required. Applicants should be clinically stable and adequately treated clinically for a minimum of three months before being considered for certification.

- Cushing’s Syndrome secondary to malignancy or ectopic ACTH secretion is disqualifying. Applicants with other causes may be certificated once the underlying disease has been effectively treated and hormonal status has returned to and been maintained within normal range for a minimum of three months.

- Applicants with Addison’s disease may be certificated once their underlying disease has been effectively treated and their endocrine status has returned to and been maintained within normal range for a minimum of three months.
2.4.9 Parathyroid Disorders

Parathyroid disorders and associated disorders of calcium metabolism have the potential to impair a person’s ability to control an aircraft or to act as an Air Traffic Controller. Hyperparathyroidism leading to hypercalcaemia increases the risk of renal stone formation, peptic ulcer, mental changes and cardiac arrhythmia. (Hypercalcaemia due to malignancy should be excluded in such cases.) The less common hypoparathyroidism, if associated with hypocalcaemia, may cause disabling neuromuscular irritability and abdominal cramps.

Investigations

Prior to (re-)certification of an applicant with parathyroid disease, CASA requires a report from an endocrinologist or specialist physician and copies of pre- and post-management serum calcium and PTH levels\(^2\). If the applicant has suffered abdominal pain, CASA requires the results of imaging performed to exclude renal stones. Histology reports of specimens and the results of investigations to exclude underlying malignancy will assist in determination of the applicant’s fitness for medical (re-)certification.

Medical Certification of Persons Suffering from Parathyroid Disorders

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

- Applicants with hyperparathyroidism due to parathyroid adenoma may be (re-)certificated without condition(s) three months after surgical removal of the adenoma, provided that hormone and calcium levels have returned to and been maintained at normal levels. Hypercalcemia due to malignancy must be excluded. Full clinical details are required.

- Applicants with hypoparathyroidism may be (re-)certificated when estimation of hormone and calcium levels demonstrates that they have been stable on treatment (calcium and/or Vitamin D analogues) for at least three months.

\(^2\) Note that poor venepuncture technique may lead to spurious PTH and calcium results.
2.4.10 Hyperlipideamia

Hyperlipidaemias are an important risk factor for the development of coronary artery disease, stroke and heart failure, which are important potential causes of in-flight incapacitation. Control of lipid levels is an important mechanism for reducing the risk of in-flight incapacitation due to vascular mishap. Similar considerations apply in the case of ATC staff.

Investigation

Blood for lipid estimation (including total cholesterol, HDL, LDL and glucose) should be drawn after fasting—that is, after the applicant has had nothing to eat or drink except water for 12-14 hours. Abstinence from alcohol for several days prior to the test may lower triglycerides levels. Dietary changes in the few days before testing have little effect on lipid levels.

Medical Certification of Persons Affected by Hyperlipidaemia

- Persons with elevated cholesterol/triglyceride levels controlled by dietary means and/or nutritional supplements are not of medical concern to CASA.
- CASA is primarily concerned over the potential for lipid lowering drugs to cause side effects of aeromedical significance. CASA will certificate pilots (both Class 1 and 2) or ATCs taking any of the lipid lowering drugs currently available on prescription in Australia, provided the applicant tolerates the medication well and experiences no significant adverse side effects. A minimum of one month of ground testing is required before the applicant returns to flying/controlling duties.
- Lipid estimation is part of CASA’s cardiovascular risk management program. Should a Class 1 or Class 3 medical certificate holder be found to have an annual risk of cardiovascular event greater than 1% (currently a score of 15 or more points on CASA’s cardiovascular risk assessment tool), he/she will be required to undergo a stress ECG per CASA protocol.
2.4.11 Obesity

Obesity, defined for CASA’s purposes as a BMI >35, is of medical concern because:

- It is an independent risk factor for the development of vascular disease
- The physical dimensions of the obese person may reduce a pilot’s ability to manipulate an aircraft’s controls safely, or to escape in the event of accident or incident.

**Investigation**

Applicants who have a BMI >35 must be assessed by a DAME, who is to seek evidence of other pathology secondary to the obesity. Obese pilots will be required to demonstrate their ability to control an aircraft safely and to escape in the event of an emergency as part of their certification assessment. This may involve undertaking a CASA directed operational flight/ground check.

**Medical Certification of Obese Applicants**

Obesity per se is only of concern to CASA from an air safety perspective if an applicant suffers from another aeromedically significant disease or condition secondary to the obesity or his/her physical dimensions affect the safe exercise of the privileges of a licence. Such applicants will be assessed on a case-by-case basis. Obese applicants who are otherwise well and can exercise the privileges of a licence safely will be certificated without restriction.

2.4.12 Anorexia

Adult applicants with a BMI <18.5 may suffer from an eating disorder. Prior to certification, a DAME should assess them to exclude such disorders. See section 2.6 Psychiatry.

2.4.13 Appetite Suppressants

CASA will not authorise pilots to fly or ATCs to perform ATC duties when taking any appetite suppressant medication.
2.5 Neurology

2.5.1 Introduction

This section on neurological disorders outlines some of the major categories of neurological diseases that are commonly encountered and indicates their aviation medical significance.

2.5.2 Nervous System Standard – CASR Part 67

The nervous system standards are found in the following paragraphs of CASR Part 67:

- **CASR 67.150**
  - For medical standard 1
  - Table 67.150
  - 1.7 – 1.8

- **CASR 67.155**
  - For medical standard 2
  - Table 67.155
  - 2.7 – 2.8

- **CASR 67.160**
  - For medical standard 3
  - Table 67.160
  - 3.7 – 3.8
2.5.3 Headache

Nearly all applicants have experienced headache. The diagnosis of primary headaches are not discrete and the different types should be considered to be part of a continuous spectrum ranging from Muscular Tension Headache at one end to Classical Migraine at the other. Secondary headaches from other conditions eg, Cranial Neuralgia, Temporal Arteritis should be considered separately.

When considering primary headaches it is important to assess the history according to:

- **Speed of onset**: Is there warning eg, aura or no warning?
- **Period of prodrome**: seconds, minutes or hours?
- **Frequency**: isolated or recurrent, if recurrent how often. Time off work is a useful guide.
- **Neurological symptoms**: aura (crippling or just perceived), photophobia, visual changes, paraesthesia, paralysis, dysphasia etc.
- **Severity**: need for acute and intensive intervention such as parenteral opiate analgesics, degree of incapacitation such as need for bed rest vs ability to continue complex tasks.
- **Treatments and their effectiveness**: How effective prophylaxis if used. Type of acute treatment used eg, Tryptins and speed of response and any significant side effects.
- **Precipitating factors**: such as diet, oral contraceptive etc and effect of avoidance or withdrawal of such factors.

Since objective investigations will most usually negative, a detailed history is essential. The best history is obtained at first presentation.

*Migraine*

For strict diagnostic purposes, migraine is an acute but reversible transient cerebral vascular insufficiency phenomenon and headache is not necessary the most important component. When the vascular insufficiency effect predominates it should be distinguished from transient ischaemic attacks. In the worst case migrainous stroke can occur where the implication for flight duties is similar to that for stroke.

Beware of Atypical Migraine without headaches.

In common usage, the term migraine may refer to any headache, but there are two main types — common migraine and classical migraine.
Common Migraine (Migraine without Aura)

More than 80% of migraine sufferers experience "common" or "non-classical" migraine, which is not associated with sharply defined neurological disturbances.

It is often a label used for Tension Headache perceived to be of significant severity by the patient. Careful history will avoid the diagnosis of migraine with its implication vs. Tension Headaches

Diagnosis of "nonclassical" migraine depends on:

- Detailed history of headaches
- Usually an absence of significant neurological symptoms.

Treatment usually does not include parenteral opiates or specific migraine drugs such as vascular active agents.

Classical Migraine

Classical migraine is accompanied by any transient focal neurological and/or vascular phenomena that may include:

- Unilateral headache
- Hemiparesthesia, Hemiplegia
- Retinal/Occipital phenomena, such as visual disturbance of various degree and scotomata
- Basilar artery phenomena
- Autonomic symptoms of nausea, vomiting etc.

Such migraines have variable periods of remission and rate of onset, and may completely incapacitate the sufferer. There is no universal exclusion of medication. Significant side effect should be explored and their presence or absence documented.

Adverse factors for aeromedical certification include:

- Sudden significant neurological symptom such as loss of vision, weakness and incoordination with no warning
- Failure or of prophylactic treatment with frequent attacks
- Requirement for intensive treatment
- Short prodrome that does not allow effective use of acute treatment before symptom onset.

The Aviation Medicine Section considers all cases individually.
Cluster Headache

Cluster headache is a subgroup of vascular headaches where the frequency of occurrence has a characteristic “cluster” nature. Aeromedical certification assessment considerations are similar to those for migraine. The details of history required are the same.

Other Types of Headache

Tension (Muscle Contraction) Headache

This category of headache can assume the nature of a vascular headache with a pulsating quality when it is severe and is often confused with migraine.

It includes headaches occurring secondary to other conditions that gave rise to muscular tension, e.g. eyestrain, cervical pathologies, psychiatric conditions in which management of the underlying cause is of prime importance.

Chronic tension headaches that require treatment such as anxiolytics or other drugs likely to cause a decreased state of alertness or diminished performance require specialised assessment.

Cranial Nerve Headache

The commonest of these conditions is trigeminal neuralgia. This may be idiopathic or secondary to underlying disease. Irritation of the nerve may be relieved by surgical intervention, which requires specialised neurosurgical assessment. Consideration must be given to the risk and implication for certification associated with any neurosurgery. The side effects of medications commonly used in its treatment include diminished judgement and diminished depth perception. Relevant history should be elicited and documented.

The Aviation Medicine Section assesses all cases individually.

Local Cranial Disease

Temporal arteritis

This condition need not be disqualifying if controlled, particularly when steroid therapy has been ceased. Full specialist reports are required for assessment.

Adverse factors associated with it include loss of vision and intracerebral involvement with significant functional sequelae.

The Aviation Medicine Section assesses all cases individually.
2.5.4 Blackouts, Loss of Consciousness and Syncope

These words are often used interchangeably by both laymen and medical professionals. A detailed description is more informative than the label. It does not necessarily describe loss of consciousness (LOC) but can be used to mean an altered state of consciousness, vertigo or even psychiatric disturbance such as fugue-like states. Causes can be primarily neurological, secondary to cardiovascular pathology, gastrointestinal upset, physiological or even be specific to aviation causes such as G induced loss of consciousness.

History of the event is paramount in differentiation of the causes. The applicant should be directed to relive the experience in his/her own words, without prompting. Only when that is established should more direct questions about the circumstances before, during and after the event be asked. The patient's account of sensations should be elicited. Observer history should be obtained if available. If uncertainty exists, record the uncertainty rather than introduce attempts at explanation. Such factual records allow further independent evaluation where necessary. The value and accuracy of the history deteriorates with time and repetition of recounting.

Specific features that will help in differentiating the physiological system involved are:

- **Prodrome**: absence or present.
- **Posture at the time of the episode**.
- **Period**: ie, duration of attack.
- **Postictal orientation**.
- **Activity before, immediately and within 24 hr preceding**.
- **Head trauma**.
- **Frequency**.
- **Urinary incontinence**.
- **Tongue biting**.
- **Observer report**: confirmation of patient’s account, particularly concerning convulsive movements. Time course to any convulsive movement is important ie, did it occur at the same time as LOC, or seconds later?
- **Bystanders’ action**: eg, promptly placing patient in prone or coma position, or keeping patient sitting/upright.
- **Family and/or past history**.
- **Known cardiovascular history or risks**.
- **History of infection such as recent viral infection that may support labyrinthitis**.
Depending on the historical features elicited, the need for referral to relevant specialist/s can be determined. If the cause is primarily neurological, refer to neurologist or neurosurgeon for clarification. For possible cardiovascular causes, cardiologist opinion should be sought. Where the history suggests vestibular problem, ENT opinion will be appropriate.

The Aviation Medicine Section assesses all cases individually.

**Concussion**

The term should be restricted to brief LOC in the setting of blunt head injury with no demonstrable intracranial injury. The emphasis is on the brief duration, which should be in the order of 5 minutes or less. If the event accords with these criteria and no sequelae are reported, it is generally of no significance for aeromedical certification. An exception is made for repeated concussions such as occur in boxers.

**Transient Global Amnesia (TGA)**

The cause of TGA is uncertain. It may be first warning of TIA. Current theory considers it to be a transient, migraine-type of vascular phenomenon. The condition should be distinguished from epilepsy, particularly complex partial epilepsy and symptomatic intracranial tumours.

Relapse can occur and may be precipitated by exercise, coitus, or exposure to water. A period of observation is necessary to monitor relapses. Risk of relapse is 30% and can recur once or twice. Where frequent attacks are present, other diagnoses should be considered.

The condition is benign and affected applicants can be aeromedically certificated following a suitable period of observation. Neurological reports are required in all cases and follow up reviews may be necessary.
2.5.5 Disorders of Equilibrium

**Benign Positional Vertigo**

This is a true rotational sensation accompanied by nystagmus, occurring only on change of head position. It is usually idiopathic or secondary to head trauma. Its course is variable. Assessment is based on the frequency of occurrences, their duration and severity.

**Acute Peripheral Vestibulopathy (Vestibular Neuronitis and Acute Labyrinthitis)**

Diagnosis implies temporary unfitness to fly. If the condition settles without recurrence, a return to unrestricted flying may be permitted after three months.

**Menière's Disease and Acute Recurrent Positional Vestibulopathy (ARPV)**

In these conditions, vertigo usually lasts for hours and often causes chronic disequilibrium. Menière's disease and ARPV have high recurrence rates. Applicants with these conditions are usually unable to meet the standard for certification, but require individual assessment.

**Alternobaric Vertigo**

In this condition, vertigo occurs on change of air pressure, often after a forceful Valsava manoeuvre to clear the ears. Oscillopsia and nystagmus may accompany it.

Occasionally this condition is due to chronic eustachian tube compression (e.g. by hypertrophied adenoids) and may thus be surgically correctable. Recurrent cases are assessed individually.

**Momentary Vertigo**

This is generally considered to be benign unless there is evidence that it significantly affects the applicant.

**Non-Functioning/Hypo-Functioning Labyrinths**

This condition is characterised by unsteadiness of gait, by loss of orientation (particularly in the dark) and by inability to maintain accurate visual fixation while in motion. It is often secondary to aminoglycoside administration. The degree of functional impairment should be fully investigated for decision by the Aviation Medicine Section.
Vestibular Imbalance

Applicants with this condition may experience feelings of unsteadiness on rapid change of position. It is generally benign and a “pass” assessment may be issued.

Multisensory Dizziness

This is a chronic condition of loss of balance or feeling of light-headedness in persons with multiple sensory disorders, such as a combination of two or more of:

- Peripheral neuropathy
- Vestibular imbalance
- Visual impairment
- Cervical spondylosis, and
- Hearing loss.

Multi-sensory dizziness is assessed according to the degree of disability present.

Note: Drugs used to control dizziness and vertigo often produce drowsiness. Control of these symptoms by drugs with such side effects is not acceptable for pilot or ATC medical certification. See also Section 2.13 Medication – Drugs and Flying/Controlling
2.5.6 Seizure Disorders

General

The tendency towards epileptic seizures is not an “all or nothing” phenomenon. Most people, under certain conditions, may have a seizure if sleep deprived or withdrawing from alcohol or benzodiazepines, especially if in addition they are taking medications that decrease the seizure threshold (e.g. tricyclic antidepressants). Approximately 2% of the population have a seizure during their lifetimes.

Following a single seizure, an adult has a 30-40% chance of recurrence. Those with a distinct epileptiform abnormality on the EEG, in the setting of a history of seizure, as opposed to non-specific abnormalities, have an increased risk of further seizures.

Diagnosis

It is imperative that there be an accurate diagnosis of the type of seizure. The importance of a description of the event cannot be overemphasised. While a useful diagnostic tool, any EEG must be reviewed by an experienced reader and must be evaluated in the context of the clinical history. It is not a useful sole diagnostic or screening tool.

The important components to the diagnosis are:

- More than one event, except Post Traumatic Epilepsy (PTE) for which one event will establish the diagnosis
- Must be unprovoked.

Video-EEG confirms the diagnosis but is not easily available as it is time consuming and difficult to organise except in academic research facilities.

Aeromedical certification considerations

A detailed history and specialist neurologist opinion is essential. Provoking factors must be considered. Their absence suggests a poor prognosis.

Significant adverse factors are:

- Unavoidable concomitants of aviation eg, strobe lights, propeller flicker, fatigue
- Difficult to avoid eg, menstruation.

Provoking factors that are avoidable or insignificant in context of aviation are:

- Alcohol excess and/or withdrawal
- Sleep.
These should be considered with regards to risk of occurrence in the absence of such factors.

Individuals with established epilepsy, ie, more than one unprovoked attacks, are unfit for aviation medical certification. Persons who have experienced seizures but who are not diagnosed as epileptic may be deemed to meet the medical standard.

**Partial (Simple or Complex) Seizures without progression to Generalise Seizures**

The term Partial Seizure often misleads patients to consider the condition is not as significant as the classical Grand Mal Seizure. Careful counselling of patients should include the explanation that such terms are anatomical and electro-physiological distinctions. The functional effect of impaired conscious state and/or brain activity is equally as significant as in other epilepsy.

**Sleep (Nocturnal) Epilepsy**

Epilepsy that occurs only when asleep is distinguished from sleep disorders such as Sleep Behaviour Disorder, Sleep Apnoea etc. Such disorders must be excluded. Sleep EEG recordings—best with video recording (if possible), will confirm the diagnosis.

The condition is associated with increased risk of seizure when awake ie, progression to the more “classical” type of epilepsy. This risk is increased when the condition is untreated.

Since aircrew and air traffic controllers are not performing flight-related duties when asleep, sleep as a provoking factor is not relevant in the aviation context. When the condition responds to anticonvulsants, the risk of such a seizure during flight related duties is further reduced.

Prior to certification, the effect of anticonvulsant control failure or “breakthrough” must be considered. Expert neurological opinion should be sought to determine if such a control failure occurs. The first presentation may be recurrence of sleep epilepsy or epileptic seizure whilst awake. Recurrence that first presents as fits whilst awake poses a flight safety hazard.

Aviation Medicine Section assesses all cases individually.

Important indicators of less risk are:

- No further occurrence of sleep epilepsy
- Absence of significant side effects of anticonvulsant.
2.5 Neurology

Childhood Seizures

Childhood febrile seizures that are brief, not associated with neurological deficits and have ceased before the age of five are not generally disqualifying. The applicant must have been off all anti-epileptic medications for at least five years and the off-medication EEG, should be normal.

The seizures of Benign Rolando Epilepsy of Childhood usually involve the face, tongue or hand and are often precipitated by drowsiness or sleep. The EEG shows significant abnormalities from the Rolandic area. Individuals with this condition may be considered for certification if they have been seizure free and off medication for ten years. They must have a normal neurological examination and EEG. A sleep deprived EEG should also be obtained and must be normal prior to issue of any aviation medical certificate.

Petit Mal or Juvenile Myoclonic Epilepsy is seizure disorders that occur in childhood. Because such conditions may persist into or present during adulthood, they are considered as subtypes of epilepsy. These conditions are associated with a risk of progression to generalised convulsions.

The Single Epileptiform Seizure

Extreme care must be taken to diagnose epileptic seizure in the presence of a single event. Clonic movements from transient brain hypoxia or from other causes are often reported as seizures. The condition should be considered as Loss of Consciousness (see above section on Blackouts, Loss of Consciousness and Syncope). Non-epileptic causes should be sought and excluded.

An individual with a single epileptiform seizure is initially unfit for medical certification. A case may be reconsidered five years from a seizure if the following conditions are met:

- Specialist neurological examination is normal
- Repeated EEGs, including sleep-deprived EEGs, do not reveal any significant abnormalities
- Studies incorporating additional nasopharyngeal or minisphenoidal electrodes, if relevant, do not reveal any significant abnormalities
- Neuro imaging, preferably by MRI, has demonstrated normal brain structure.

For continued medical certification five years after initial certification or recertification, all of the above investigations must be repeated and reported as normal. Applicants for Class 1 certification may be restricted to "as or with co-pilot" for a further two years. Individuals who have a second seizure are considered to have epilepsy.
2.5 Neurology

When a single seizure was related to alcohol withdrawal, applicants may be considered for medical certification earlier if they have a normal EEG and Neuro imaging, and psychosocial and biochemical evidence is presented that their alcohol abuse is in a continuing "recovery" phase. The alcohol abuse should be dealt with as a separate medical problem.

Those who have had a seizure while on tricyclic antidepressant drugs or other seizure enhancing medications should be considered more prone to seizures than the average population. Both neurological and psychiatric opinions should be sought to manage their interrelated problems. Psychiatric report should indicate the optimum treatment required and if alternative treatment is suitable and/or available. The neurological report should indicate the applicant’s risk of further seizures, particularly if using other psychotropic medication for psychiatric treatment.
2.5.7 Head Injuries

There are two major concerns over fitness for aviation-related duties following head trauma. One is the neuropsychological consequence of the trauma in applicants who have not had any clear focal deficits and the other is the possibility of Post Traumatic Epilepsy (PTE).

The neuropsychological consequences are secondary to the effects of acceleration/deceleration forces on the skull and brain. Because of the anatomy involved, these forces cause their greatest focal damage to the orbital, frontal and anterior temporal areas of the brain. Diffuse white matter damage may be associated with the cortical damage.

The result of such injury is dysfunction in a number of functional executive activities of the brain. Frequent effects include:

- Slowing of reaction time, impaired memory and decreased ability to maintain a high level of performance over time, particularly in settings of complex activities and choices,

- A high propensity for further mental decline with fatigue, and

- Other problems include maintaining attention, initiation and proper sequencing of tasks, difficulty in planning and anticipating, and difficulty in establishing automatic responses to a trigger.

The affected individual may not notice or care that the task is being poorly performed. Stress, fatigue and pain may exacerbate all these effects, and the handling of simultaneous emergency tasks is particularly affected.

Although the effects of head trauma may be severe, routine IQ and mental status testing may be within normal limits. Fortunately there is a natural tendency for neurological deficits to improve with the passage of time. There are a number of ways to predict the outcome of a head injury. The most commonly used is the duration of post-traumatic amnesia (PTA). Serial sequential neuropsychological tests separated by months or years can document changes associated with improvement of neurological deficit. A pre-trauma baseline test of such nature will provide the ideal reference but is not usually available. The limitations of neuropsychological testing should be recognised eg, learning; subjective interpretations by the tester, interface issues (particularly if computer-based) and its results should be interpreted with these limitations in mind.
Mild Brain Injury

This is characterised by:

- Transient loss or alteration of consciousness without any focal neurological deficit and with rapid return to alertness and orientation
- Post-traumatic amnesia (PTA), which occurs when a person is conscious but ongoing events are not recorded in the memory. The duration of this lapse must be less than one hour; and
- Post-traumatic syndrome (PTS) which comprises a symptom complex involving:
  - Dizziness
  - Emotional impairment
  - Intellectual impairment, and
  - Headache.

Applicants with mild brain injury are generally considered to be fit to fly unless there is a history of PTS, which takes more than six months to resolve.

Any alteration of consciousness associated with head trauma is a sufficient indicator of likely brain injury that flying should not be undertaken for at least two weeks — the period during which "early" post traumatic epilepsy is most likely to occur.

Even in the absence of other risk markers or of a neurological deficit, a more prolonged loss of consciousness and its associated post-traumatic amnesia should be followed by longer periods of suspension from aviation related duties, as follows:

<table>
<thead>
<tr>
<th>PTA Duration</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 HR</td>
<td>1 month</td>
</tr>
<tr>
<td>1 HR - 24 HRS</td>
<td>3 months</td>
</tr>
<tr>
<td>&gt; 24 HRS</td>
<td>At least 1 year</td>
</tr>
</tbody>
</table>

In all cases, formal confirmation of neurological fitness should precede a return to flying and referral to the Aviation Medicine Section for a final decision is required.

Moderate and Severe Brain Injury

The significant factors in the assessment of head injuries, which produce moderate or severe brain injury, are:

- Extent and nature of any neurological deficit
- Risk of post-traumatic epilepsy (PTE).
2.5.8 Post-Traumatic Epilepsy Markers

A past history of febrile convulsions in childhood and/or a family history of epilepsy doubles the risk associated with any other markers.

Early post-traumatic epilepsy that occurs within the first week following injury carries a 25% risk of later epilepsy. Convulsive movements that accompany an impact head injury do not increase this risk. However, any convulsive activity following the immediate effects of impact, however shortly thereafter these occur, should be considered as "early post-traumatic epilepsy".

Demonstrated haemorrhage within the brain substance, particularly the cortical part, is associated with 25-45% risk of PTE. Depressed fractures or presence of blood in the subarachnoid space are not reliable guides to risk of PTE. However, the presence of such findings should alert investigators to search for bleeding within the brain substance.

Both CT scan and MRI are desirable in assessment of such bleeding. Availability dictates which test is performed. MRI has the advantage of being able to grade breakdown products from blood and can be very sensitive for late imaging where no initial CT or MRI was performed. Where possible an initial CT and/or MRI should be performed. If the history suggests a severe head injury and no initial imaging available a MRI should be performed to detect residual changes associated with bleeding within the brain substance.

A normal MRI should be reassuring.

Other markers are the presence or absence of a post-traumatic amnesic interval of more than twenty-four hours, focal signs, and early post-traumatic epilepsy.

Once the first post-traumatic week (the period of early PTE) has passed, the risk of subsequent PTE decays exponentially. By two years, the residual risk is less than 20% of that immediately post-injury and at four years it is less than 10% of that initially present.

When considering recertification, a residual risk of PTE of 1% or less is acceptable, given that the prevalence of epilepsy in the community is 0.33%.

Conditions that require careful assessment and which most commonly result in a "fail" assessment are: epilepsy, intracerebral haematoma, persisting CSF fistula, primary open cerebral laceration, and the presence of any significant permanent neurological deficit.
Recertification Guidelines

The Aviation Medicine Section applies the following guidelines:

1. Applicants with PTA lasting 30 minutes or less, who after the event have a normal neurological examination and no sequelae, may return to full duties in three to four months if the CT scan is normal.

2. Applicants with PTA from 30 minutes to 24 hours, with a normal MRI and EEG, are acceptable after 12 months. If a seizure occurred in the first week after trauma in an adult, a longer interval before re-licensing is required. Such cases are assessed individually.

3. If there is PTA greater than 24 hours, but Neuro imaging and neuropsychological testing are normal, applicants can be declared fit after two years. Flight simulator testing may provide additional valuable information in these cases.

4. Applicants with head injuries associated with intracerebral haemorrhage or focal deficit, whose neuropsychological testing does not show significant sequelae at 5-7 years post trauma, may return to duties after 7 years. Those who demonstrate abnormal neuropsychological sequelae have been more seriously injured and are considered individually. MRI is essential to determine presence or absence of bleeding.

5. Use of an anticonvulsant may mask the presentation of any PTE. The duration of the seizure free period should be considered as beginning only when applicant is off anticonvulsant medication. Where the risk of further seizures is considered to be too high to cease medication, the applicant is not medically fit for certification.

2.5.9 Neurosurgery

Opening the skull is not necessarily a permanently disqualifying factor for flight crew or ATC certification.

Assessment is based on:

- The underlying disease and its prognosis
- Any neurological deficit
- Surgical approach and any associated induced injury to the brain substance along the approach path
- Any risk of post operative epilepsy secondary to destruction or removal of cerebral tissue
- Location of the supratentorial/infratentorial lesion.

Full reports are required in all cases. DAMEs should issue a “doubtful” assessment and provide explanatory notes.
2.5.10 Cerebrovascular Diseases

These pathologies are usually secondary to or associated with other medical conditions and these should be sought and controlled besides dealing with the presenting cerebrovascular events. Investigations are more informative regarding the causes than the history alone. Imaging by CT scan, MRI or Angiography will differentiate the various types. Other investigations such as lipid profile, stress test for coronary ischaemia, ultrasound of carotid and heart, digital subtraction angiography etc should be considered to address non-cerebral conditions. The treatment of these non-cerebral pathologies may introduce factors affecting aeromedical certification, eg, use of an anticoagulant.

Specialist neurologist assessment is mandatory. Opinion should specifically include the risk of:
- recurrence
- epilepsy
- subtle or acute incapacitation.

Such assessment should be supported by reference to current literature with reasoned opinions.

Where subtle functional changes are suspected, neuropsychological testing to quantify the changes should be undertaken. These tests can be expensive and are open to varying interpretations.

Ischaemia

Assessment of transient ischaemic attacks (TIAs) and reversible ischaemic neurological deficits (RINDs) depend upon their causes.

- **Stenosis.** Although stenotic lesions may be bypassed or treated by endarterectomy, the risk of continuing TIAs and cerebral infarction remains high.
- **Embolism.** The risk of recurrent embolism or of haemorrhage secondary to anticoagulation is high.
- **Postural.** Individual assessment is required, but most instances are related to head movements necessary for flying.
- **Vascular headache.** See earlier section on Headache.
- **Blood hyperviscosity.** This condition may be due to polycythaemia, myelomatosis, Waldenstrom's macroglobulinaemia, etc. These cases are assessed individually and usually result in "fail" assessments if the hyperviscosity cannot be controlled.
- **Hypertension.** If adequate control is established with the use of suitable drugs, these applicants may be considered fit.
All precipitating or associated pathologies should be addressed and separate reports relevant to them included.

Aviation Medicine Section assesses all cases individually.

**Haemorrhage**

There are two major types of cerebral bleeding:

- Intracerebral haemorrhage, producing cerebral infarction
- Subarachnoid haemorrhage.

Most cases are secondary to leakage or rupture of an aneurysm; some are secondary to arterio-venous malformation. Surgery to treat them may cause injury to brain matter with associated post-operative epileptic risk. Details of the surgery should be included in reports.

20% have no identifiable cause but may be related to sustained hypertension or to transient elevation of blood pressure.

All affected patients are at risk of later developing normal pressure hydrocephalus with visual field loss and corresponding subtle incapacitation. This possible complication should be looked for and excluded as part of the follow up of all affected applicants.

Aviation Medicine Section assesses all cases individually.

**Cerebral Infarction**

Applicants who have suffered a cerebral infarct are generally considered unfit for at least one year. Recertification depends on:

- Underlying pathology leading to the stroke
- Absence of neurological deficit
- Risk of recurrence
- Assessed risk of future seizures.
2.5.11 Infections of Central Nervous System

**Meningitis**

All applicants diagnosed with meningitis should not engage in flight duties for six months. Return to flight duties depends on the nature of the infecting agent or cause of meningitis, eg, viral, bacterial or fungal, and the degree of recovery of resultant deficit and risk of development of epilepsy or hydrocephalus.

**Encephalitis**

This is dealt with as for meningitis.

**Brain Abscess**

Assessment is based on the underlying cause and whether the lesion is:

- Supratentorial, in which case the risk of epilepsy and the degree of deficit must be considered, or
- Infratentorial, where the nature and degree of deficit must be considered.
2.5.12 Degenerative Disease

Dementia

Dementia is defined as deterioration in cognitive abilities that impair the previously successful performance of activities of daily living. The examining doctor is in a better position to assess an applicant with possible dementia if there has been contact over some years and changes over time can be more readily appreciated.

Memory loss, particularly short term, is most common and tends to affect executive function. (Planning, initiation and regulating behaviour for systematic, goal-directed activity. It is highly involved in novel situations where long term memory “experience” is not adequate).

In the aviation medical examination, presentation of dementia tends to occur at early stage in the process, with consequently difficult diagnosis. Pathologies that cause secondary dementia should be sought and excluded before a diagnosis of primary dementia is made. Age of onset is not a reliable guide. With aging, frequency of all pathology increases. Dementia, primary or secondary, is one of the many manifestations of increasing age. In the absence of pathology, even advanced age is not a reason for refusal of medical certification.

In early dementia, diagnosis usually is made by exclusion. Where a positive finding is present eg, brain atrophy on CT scan, the diagnosis is more likely. However, the absence of such findings does not preclude the diagnosis. Investigations should be guided by pathologies that produce secondary dementia.

Clinical examination can be formal or informal. Abnormal performance of tasks such as form completion, or following simple instruction such as undressing should be recorded. Mini-Mental State Examination has limitations because of its dependence on the applicant’s linguistic ability, educational level and cultural background, particular in the early and late stages of the condition. Other reasons for poor test performance should be carefully considered before the result deemed positive. If test performance is normal, the presence of dementia is unlikely.

The greatest diagnostic challenge occurs where formal tests appear normal yet a family member or the examiner’s prior knowledge of the applicant indicates the presence of changes in mentation sufficient to cause concern. A flight performance report from instructors should be sought. Formal flight test may be necessarily. Assessment of flight performance must take account of the pilot’s experience and currency. Highly experienced pilots may perform adequately even when mildly impaired. Comparison with previous performance or with that of other pilots’ with similar experience should be sought.

Many dementias are progressive but some may be static. Where dementia has been demonstrated to be progressive, an immediate “fail” assessment is likely.
2. Medical Aspects

2.5 Neurology

Note: If dementia is secondary to metabolic disease or correctable organ failure, there may be significant recovery of mental function following effective treatment. Aviation Medicine Section assesses all cases individually.

Normal Pressure Hydrocephalus

Treatment is not effective in preventing progression and subtle incapacitation may develop even in the presence of a working shunt. Assessment will be "fail".

2.5.13 Extrapyramidal Disease

Parkinsonism

This is characterised by:

- Rigidity
- Bradykinesia
- Tremor—although a "resting" tremor eases with movement, stress may produce a "reversal" with worsening of tremor on movement.

Parkinsonism can be a manifestation of other diseases and such causes should be sought and dealt with. Parkinson's disease is a chronic, progressive disorder of primary Parkinsonism with no evidence of more widespread neurological involvement

The functional effects of Parkinsonism can be variable. A careful record of neurological deficits, including effect on common activities, should be made. This will serve both as a quantitative appraisal tool and for comparison in evaluating subsequent progression of the condition.

A flight test is an essential component of evaluation. It should be the last of the tests performed and does not replace clinical assessment.

Applicants may be assessed as fit for certification if there is no adverse effect of treatment such as postural hypotension or "on-off" phenomena, and if the following features are adequately controlled:

- Bradykinesia
- Rigidity
- Tremor
- Adjustment of centre of gravity
- Voice quality
- Rapid scan eye movement.
Significant sequelae relevant to aviation safety include:

- Altered colour vision
- Dementia (late phenomenon)
- Depression (early as reaction to diagnosis, or later as a primary phenomenon)
- “On-off” phenomenon: abrupt but transient fluctuation in clinical state within the day, often as complication of levodopa therapy.

Progression to incapacitating symptoms or signs is generally slow. Shortened validity of certification is required to facilitate monitoring of changes. Class 1 certificate holders may require 6-monthly review and restriction to duties ‘as or with co-pilot’. All classes of medical certificate holders will require neurological review at least annually.

Applicants receiving treatment who display "on-off" phenomena will not be certificated to continue flight duties due to the likelihood of rapid onset of incapacitation within the time period of a typical flight.

### 2.5.14 Demyelinating Disease

**Multiple Sclerosis (MS)**

MS is characterised by multiple episodes of demyelinating attacks within the central nervous system. Diagnosis cannot be made following a single attack unless confirmed by MRI changes. A single attack with a single lesion on MRI does not confirm the diagnosis. Multiple lesions in the clinical setting of single attack may be consistent with the diagnosis.

The course of the disease can be relapsing-remitting or progressive. In the relapsing-remitting type some patients may remain static for many years while some will relapse at variable frequency. Favourable prognostic features are: isolated optic neuritis or other sensory change, complete recovery, age of onset younger than 40 years, female, fewer than two relapses in the first year of illness and minimal impairment five years after the first presentation.

Progressive type of MS has a 50% probability of functional deficit in daily life activities requiring assistance at 10-15 years from initial diagnosis.

Typical attacks in mild cases have onset over days rather than minutes. However in severe cases, attacks can present as an acute neurological event. Seizure is uncommon.
In all cases, assessment depends upon:

- Nature of symptoms
- Time between exacerbations
- Residual deficit
- Likelihood of sudden incapacitation
- Activity of the disease.

A flight test may be necessary to determine the effect of any residual deficit.

All cases of MS require formal neurological opinion. Aviation Medicine Section assesses all cases individually.

Any subsequent certification will require regular specialist reviews.
2.5.15 Intracranial Tumours

(See also Section 2.14 – Malignancy.)

Three factors affect the aeromedical disposition of applicants with intracranial tumours:

- Malignant or benign
- Treatment modality: chemotherapy, radiotherapy, surgery
- Degree of brain involvement.

Certification of applicants with secondary malignant brain tumours is principally a function of the characteristics of the primary tumour.

Certification of applicants with primary malignant brain tumours depends on prognosis in terms of malignancy and sequelae of any treatment received.

Certification of applicants with benign brain tumours depends on tumour size and location and the effect of any treatment.

**Radiotherapy**

Whole brain irradiation may be associated with late radiation injury effects. Focal irradiation may cause residual changes demonstrated on MRI. Such complications should be monitored for and excluded.

**Chemotherapy**

Systemic effects have to be considered in any aeromedical assessment.

**Surgery**

Effects occur regardless of the tumour’s malignancy. For tumours within the brain, aeromedical concerns are for brain substance loss, with associated neurological deficit, and surgically induced bleeding into brain substance, with associated post-“traumatic” epilepsy.

Essential factors for consideration are:

- **Site of tumour:** supra or infratentorial
- Surgical approach
- Details Of The Surgery: amount of intraoperative bleeding, retraction and compression of brain, and any intraoperative difficulties or complications.
The treating neurosurgeon’s report and opinion on the risk of epilepsy is a mandatory requirement for aeromedical assessment and must include:

- Details of any neurological deficit from brain substance loss or as result of surgical approach
- Risk of epilepsy
- Risk of recurrence of tumour.

Benign tumours not involving brain substance such as meningioma or acoustic neuroma should be considered in terms of:

- Treatment used: radiation and/or surgery
- Severity of compression effect on underlying neural structure: brain or nerve. In respect to brain compression, the potential for epilepsy should be considered.

A report from the specialist involved is required in all cases.

The effect of different treatment combinations and their likely sequelae requires expert neurological opinion on the particular therapy.

If there is no significant neurological deficit, these applicants may be assessed as fit for pilot and ATC duties. Applicants with small tumours, with no significant deficit after treatment by cryotherapy, after which there has been no evidence of epilepsy, may be assessed as meeting the required medical standard or as posing no significant risk to the safety of air navigation following appropriate specialist neurological review.

Applicants with history of childhood cerebellar astrocytoma who have been cured and who have no deficit or history of epilepsy may be assessed as meeting the required medical standard or as posing no significant risk to the safety of air navigation.

For adult subtentorial tumours, Aviation Medicine Section assesses all cases individually.

Nasal approach to pituitary tumours has a low risk of sequelae; the primary aeromedical consideration is endocrine effect and any residual compression effect on the optic nerves.

Malignant tumours fully excised, with or without associated radiotherapy, are considered according to their potential for recurrence, effect of the treatment, and their associated seizure risk. Those treated by radiotherapy alone will require long period of observation, usually in order of years, before the condition can be considered cured. Early certification is unlikely.

Applicant with benign tumours treated by radiation alone will be considered individually, dependent on the siting and any residual pressure effects on surrounding structures.

Benign intraventricular tumours will be considered individually, with any neurological deficit resulting from the surgical approach the main consideration.
2.5.16 Extracranial Neurological Disease

*Peripheral Nerve Diseases*

These disorders are assessed on the basis of the nature and degree of deficit. Autonomic involvement may produce syncope and is generally regarded as incapacitating. Full reports are required.
2.6.1 Introduction

This section details the assessment procedures for pilots, other aircrew members and air traffic controllers (ATC) who suffer or who may suffer from psychological disorders or psychiatric disease.

The aim of the psychiatric assessment within the aeromedical examination is to ensure that applicants do not suffer from psychological disorders or psychiatric disease which places them at an increased risk of incapacitation, which may produce a decrement in psychological or higher cortical function, or which may jeopardise the safety of air navigation. A particular concern is the potential for an affected individual to commit an unsafe act that impairs the safe operation of an aircraft.

When conducting the aeromedical examination, the DAME should recognise that an individual who holds an unrestricted medical certificate must be capable of safely performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities (either as a private or a professional pilot) may include flight:

- For prolonged duration, often as part of a shift roster
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning
- Subject to disrupted sleep and time zone changes.

A number of these stressors may also affect Air Traffic Controllers.
### 2.6.2 The Psychiatric Standard – CASR Part 67

The psychiatric standards are found in the following paragraphs of CASR Part 67:

<table>
<thead>
<tr>
<th>CASR 67</th>
<th>For medical standard 1</th>
<th>CASR 67.150(7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CASR 67.150</td>
<td>For medical standard 2</td>
<td>CASR 67.155(7)</td>
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<tr>
<td>CASR 67.160</td>
<td>For medical standard 3</td>
<td>CASR 67.160(7)</td>
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</tbody>
</table>

Table 67.150  
3.4 – 3.6

Table 67.155  
2.4 – 2.6

Table 67.160  
3.4 – 3.6
2.6.3 Psychiatric Assessment

All applicants for Australian aviation medical certificates are required to complete a comprehensive screening questionnaire, to be physically examined by a DAME, and to undertake a number of screening tests.

When conducting the psychiatric component of the aeromedical examination, the DAME should note the presence of relevant risk factors for the development of psychiatric disease and the presence of signs and symptoms suggestive or diagnostic of such conditions. (A Generic Template for an Aviation Psychiatric History is being developed to guide the conduct of an aviation medical psychiatric assessment and will be provided in due course.)

For example, risk factors for the development of alcoholism include:

- Family history of alcohol abuse
- Family or work stresses
- Financial pressures
- Single marital status.

Psychometric testing may assist in making a psychiatric diagnosis and referral to a consultant psychiatrist may be indicated to confirm a diagnosis or to resolve concern over a differential diagnosis. CASA may require a pilot or an ATC to be assessed by a consultant psychiatrist as part of its consideration of an applicant’s fitness for aeromedical certification.
2.6.4 Documentation of Psychiatric Conditions

Psychiatry is a subjective science. DAMEs need to take a careful and thorough clinical history before reaching a psychiatric diagnosis, particularly a diagnosis that may have significant occupational implications for pilots or ATCs. The Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations is provided to assist DAMEs in taking such a history and to bring consistency to their reporting.

In addition to requiring a traditional narrative report of psychiatric illness in aviators, CASA will henceforth require DAMEs and consultants to classify psychiatric conditions in aircrew and ATCs in accordance with the criteria defined in the Diagnostic and Statistical Manual of the American Psychiatric Association (DSM IV). Use of the DSM system will provide CASA with a tool to ensure the uniform assessment of all aircrew and ATCs diagnosed with psychiatric disease and allow CASA to make an informed assessment of the aeromedical risk posed by a particular applicant with a psychiatric condition.

DSM IV categorises psychiatric disorders and disease along several axes:

- **Axis I** - Clinical syndromes
- **Axis II** - Developmental Disorders/Personality Disorders
- **Axis III** - Physical Disorders and Conditions
- **Axis IV** - Severity of Psychosocial Stressors
- **Axis V** - Global Assessment of Function.

The first three axes constitute the diagnostic assessment of a patient with a psychiatric condition. Conditions in Axis I (and to a lesser extent Axis II) are those most likely to be of aeromedical concern in the flying safety context. Axis III permits the clinician to indicate any current physical disorder or condition that is potentially relevant to the understanding or management of the case. (These are disorders or conditions listed outside the mental disease section of ICD 10).

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1 CASA does not require an Axis V assessment. An amended assessment scale for assessing function in Aviators is under consideration.
Axis IV provides a scale for coding the overall severity of the psychosocial stressor(s) acting upon the patient that have occurred in the year preceding the current evaluation and that may have contributed to the development, recurrence or exacerbation of a mental disorder. The rating of severity of the stressor should be based on the clinician’s assessment of the stress an “average” person in similar circumstances and with similar socio-cultural values would experience from the particular stressor(s). Clinicians should also make an assessment as to whether the stressors are acute (less than 6 months) or enduring (greater than 6 months).

Axis V permits the clinician to indicate an overall judgement of a person’s psychological, social and occupational functioning (as an aviator or ATC) on a scale that assesses mental health-illness. Two ratings should be made using this scale; the first an assessment of current function and the second an assessment of best function during the preceding 12 months.

Thus, for example, a DAME reporting on an airman with psychiatric illness may summarise his condition as follows (in addition to providing a narrative of the situation):

Axis I: Major depression: single episode, severe, without psychotic features
       Alcohol dependence
Axis II: Dependent personality disorder
Axis III: Alcoholic cirrhosis of liver
Axis IV: Stressors: anticipated retirement; grounded by company; change of residence; loss of contact with friends
Axis V: (Not required by CASA at present.)
2.6.5 Disorders Diagnosed in Childhood

**Mental Retardation**

This disorder is characterised by significantly sub-average intellectual function with concurrent deficit or impairment in adaptive functioning. Onset is before the age of 18 years. Where the results of standardised, individually administered intelligence tests indicate significant reduction in an applicant’s intellectual performance likely to limit the individual’s ability to control an aircraft and where clinical assessment indicates a deficit in adaptive behaviour, CASA will not issue a medical certificate.

**Learning Disorders**

Learning disorders are diagnosed when an individual’s achievement on individually administered, standardised tests in reading, mathematics or written expression are substantially below that expected for age, schooling and level of intelligence and when such deficits interfere with academic achievement or activities which require such skills. CASA will not issue a medical certificate to an applicant who has a learning disorder that precludes the acquisition of knowledge and information essential to safe flight.

**Motor Skills Disorders**

The essential feature of this group of disorders is a marked impairment in the development of motor coordination sufficient to interfere with academic achievement of activities of daily living. Recognition of this disorder usually occurs in childhood. Clinical course in variable, and in some cases, lack of coordination continues through adolescence into adulthood. In general, CASA will not issue a medical certificate to an applicant who suffers an impairment of motor skill sufficiently severe to threaten the safety of flight.

**Communication Disorders**

CASA will not usually issue a medical certificate to an applicant who suffers a communication disorder severe enough to compromise effective communication in the aviation environment. Practical testing may be required to establish the effectiveness of an applicant’s communication abilities.
Pervasive Development Disorders

These disorders are characterised by severe and pervasive impairment in several areas of development relative to an individual’s developmental level or mental age. Autistic Disorder is the commonest of these disorders. The essential features of an individual with this disorder are impairment in reciprocal social interaction (which is gross and sustained), impairment in communication skills and markedly restricted repertoire of activity and interests. The symptoms and characteristics of autism can present in a wide variety of combinations, from mild to severe.

Other conditions in this group include Rett’s Disorder, Asperger’s Disorder and Childhood Disintegrative Disorder.

Sufferers of disorders in this group will usually be precluded from holding CASA medical certification.

Attention Deficit/Hyperactivity Disorder (ADD/ADHD) and Disruptive Behaviour Disorders

This disorder is amongst the most common neuro-developmental disorders found in children. Its hallmarks are hyperactivity, impulsiveness and inattention beyond the norm for a child’s age. There may be wide variations apparent in the severity of this disorder. Other psychiatric conditions frequently co-exist in children suffering ADD/ADHD. While the diagnosis is reliable if made to the criteria outlined in DSM IV, concerns over the validity of the diagnosis in a particular individual are frequently expressed. Sufferers of ADHD/ADD are significantly more likely to be involved in motor vehicle and industrial accidents (whether on pharmacological treatment or not) than similar groups of individuals who do not suffer from this condition(s).

Aeromedical concerns relate to the capacity of a sufferer of ADD/ADHD to safely control an aircraft and to the potential adverse effects of amphetamine medications frequently utilised to treat this condition. To consider an application for aeromedical certification from a sufferer of ADD/ADHD, CASA requires a thorough assessment of the applicant by a consultant psychiatrist (to confirm the diagnosis against the criteria indicated in DSM IV and exclude other conditions) and the results of neuropsychological testing. Where evidence exists of persisting deficiencies in cognitive ability, behavioural aberrancy or where an applicant requires continued use of amphetamine medication, the applicant will not be aeromedically certificated.

Refer to the Criteria for the Diagnosis of ADD/ADHD.
**Conduct Disorder (Antisocial Personality Disorder of Childhood)**

The essential feature of conduct disorder is a repetitive and persistent pattern of behaviour in which the basic rights of others or major societal norms or rules are violated. CASA will not usually consider certification for a medical certificate to an applicant with a substantiated history of conduct disorder.

**Oppositional Defiant Disorder**

The major feature of this condition is a recurrent pattern of negativistic, defiant, disobedient or hostile behaviour towards authority figures that often develops gradually in childhood and may continue into adolescence and even into adulthood. CASA will not usually consider medical certification for an applicant with a substantiated history of oppositional defiant disorder.

**Tic Disorders**

A tic is a sudden, rapid, recurrent, non-rhythmic, stereotyped motor movement or vocalisation. Tics may be simple or complex, may exist in isolation or be part of a condition such as Tourette’s Syndrome. Where an applicant's tic is believed to have implications for the safety of air navigation, CASA will not issue a medical certificate. Sufferers of Tourette’s Syndrome will usually be precluded from holding medical certification.
2.6.6 Delirium and Dementia

**Delirium**

Delirium is a disturbance of consciousness, accompanied by a change in cognition that is not due to pre-existing or evolving dementia. The disturbance generally develops over a short period, and often fluctuates during the course of a day. There is generally evidence from the clinical assessment of the aetiology of the delirium which may be due to a general medical condition, substance intoxication/withdrawal, use of medication, toxin exposure or a combination of these factors.

Aviators and ATCs with acute delirium should immediately be stood down/stand down from flying or controlling duty. CASA will only consider aeromedical certification once the applicant has recovered from the delirious state, and the underlying cause of the delirium has been identified and remedied.

**Dementia**

Dementias are characterised by the development of multiple cognitive deficits (including memory impairment and one or more of the following cognitive disturbances: aphasia, apraxia, agnosia, or a disturbance of executive functioning). While dementias share a common symptom presentation they may be differentiated on the basis of aetiology.

It may be difficult to make a diagnosis of early dementia in an individual who has enjoyed a well paid and responsible position in the aviation community for many years, but who is finding it impossible to learn new skills and to retain them (e.g. changing aircraft type). Anxiety or mood disorders may co-exist. Sympathetic handling and possibly psychological evaluation may prove helpful and the latter may be necessary to exclude or establish a diagnosis of pre-senile dementia. In such cases the decision about medical certificate revalidation will need to be based upon a very careful evaluation of all clinical and occupational information.

Once an applicant demonstrates a significant impairment of memory and other cognition, he/she should refrain from exercising the privileges of the pilot or ATC licence. CASA will not usually issue an aviation medical certificate to a sufferer of dementia.
2.6.7 Mental Disorders due to medical conditions not classified elsewhere

Reserved.

2.6.8 Substance Related Disorders

This group of disorders includes disorders related to the problematic use of a drug, including non-prescription medications, prescribed medications and drugs of abuse (e.g. alcohol, cocaine), other substances (e.g. volatile solvents) and to toxin exposure. For CASA purposes, this classification does not include nicotine abuse disorder. Some prescription drugs, whilst legally prescribable, are inappropriate when used by pilots or ATCs in the aviation environment (e.g. MS Contin). The safety of medications is dealt with in Section 2.13 Medication – Drugs and Flying/Controlling. The substance related disorders are divided into two major categories: the substance use disorders (abuse and dependence) and the substance induced disorders (substance induced intoxication, withdrawal, delirium, dementia, amnesia, psychosis, anxiety, mood, sexual dysfunction and sleep disorders). CASA will not usually issue an aviation medical certificate to a pilot or ATC who suffers a substance abuse disorder or who is involved in the problematic use of drugs.

Drug Testing

Current CASA practice is to ask all applicants for aeromedical certification (original and renewal), about possible problematic use of drugs and substances. DAMEs should also look for evidence of drug or substance use/abuse in their assessment of applicants.

Applicants who admit to the problematic use of drugs/substances or whom the DAME suspects of drug/substance abuse on the basis of other history or examination findings are required to submit a urine sample for drug screening. Urine samples for drug testing purposes should be provided as part of and at the time of the DAME medical certificate examination and should be passed under the direct supervision of the DAME. The sample should then be split into two clean containers and each sealed, the applicant being offered his/her choice of samples for independent testing. The other sample is to be forwarded to the testing pathology laboratory by the DAME. (Under no circumstances is this sample to be given to the applicant). Urine drug testing required by CASA is to undertaken at the applicant's expense.

As a minimum, urine samples should be tested for the following groups of drugs: cannabinoids, amphetamines, cocaine analogues, hallucinogens, opiates, sedatives and phencyclidine analogues. In addition, the requesting DAME should request testing for any other drug/substance that he/she suspects that the applicant may be using/abusing.

Any applicant who returns a positive urine drug screen and thus confirms his/her problematic use of drugs/substances does not meet the relevant medical standard. CASA will not issue a medical certificate unless an explanation acceptable to CASA is provided.
Alcohol Abuse/Alcoholism

A number of alcohol related syndromes are described:

- **Acute intoxication** with alcohol is a concern in the aviation workplace by virtue of the way in which it impairs psychomotor performance that may potentially lead to accidents and injury. The potential for catastrophic outcomes in the aviation environment arguably render it impossible to consider any episode of acute intoxication in a pilot on duty as “uncomplicated”. Current CARs provide specific requirements on “bottle to throttle time” for pilots and ATCS and it is intended that the new CASRs, when published, will limit the blood alcohol concentration of pilots and ATCs.

- **Harmful use of alcohol** is associated with damage to the physical or mental health of the individual; in the absence of a diagnosis of the alcohol dependence syndrome. Certain specific and severe consequences of alcohol misuse may also be diagnosed separately – notably alcoholic hallucinosis, Korsakoff’s psychosis and alcoholic dementia.

- The **alcohol dependence syndrome** is a cluster of biological, psychological and social phenomena that may be diagnosed where three or more of the following features are identified during the preceding year:
  - A strong desire/compulsion to drink
  - Difficulties in controlling drinking
  - A physiological withdrawal syndrome associated with abstinence
  - Increased tolerance to alcohol
  - Neglect of other activities due to drinking
  - Persistence of drinking despite harmful consequences.

- **Alcohol withdrawal** is associated with mild to severe symptoms, including sweating, nausea, tremor and anxiety. However, it may be associated with serious complications, including convulsions or delirium (“delirium tremens”).

- An isolated **drink driving offence** does not fulfil ICD-10 criteria for harmful use of alcohol (although it does fulfil DSM-IV criteria for alcohol abuse) and CASA will generally not take action in response to a single episode of PCA. However, such offences do indicate an increased probability that other alcohol related problems might be identified, and this probability increases still further where there have been multiple drink-driving offences committed.

**Note:** The FAA prohibits the medical certification of pilots who are convicted of two or more drink-driving offences within a 3-year period.
Medical Assessment

The experience of certain major airlines and licensing authorities is that success in rehabilitation of the alcohol dependent pilot can best be achieved by early intervention and treatment, adhering to the strict protocol outlined below. By using this program it has been possible to return aircrew to active flying within four months.

- **Immediate action.** A pilot or air traffic controller must be assessed as temporarily unfit on reasonable suspicion of:
  - intoxication whilst on duty
  - harmful use of alcohol
  - alcohol dependence
  - other alcohol related problems.

Such an assessment may be taken by the airline’s own medical officer, by the DAME or by CASA, or by a member of flight crew or operations staff.

Where a pilot is thought to be intoxicated whilst on duty, particular care and sensitivity are required and the specific action taken may depend, in part, upon the company drug and alcohol policy. However, where possible, it is important to obtain an objective assessment of the alleged intoxication at the earliest opportunity. This might involve use of a breath alcoholmeter, a blood alcohol analysis or urinary drug testing. Such procedures may only be conducted with the patient’s consent. Given that blood alcohol concentration falls fairly rapidly with abstinence, such testing should be conducted as soon as possible. Refusal of testing, and any reasons given for this, should also be recorded carefully. A period of less than 4 hours between detection and testing is considered usual.

- **Treatment and rehabilitation.** If psychiatric opinion and examination confirm “alcohol abuse with or without dependency”, then a residential in-patient program is a mandatory requirement if revalidation is to be considered. The treatment program undertaken should be directed by the treating psychiatrist and may or may not include pharmacotherapy.

Where the diagnosis is considered not to constitute “alcohol abuse with or without dependency” but where there is still a degree of concern regarding an alcohol related matter, then a less intensive treatment may be indicated. For example, such treatment may comprise a day-patient program, or outpatient counselling. The circumstances in which this may be offered must be a matter of judgement. (Arguably, heavy drinking as a cause of an elevated GGT or hypertension, but without any other complications or problems, might be an example of such circumstances.)
Follow-up and monitoring. DAMEs or CASA should be advised as soon as treatment is considered necessary so that follow-up review may be arranged to commence immediately following discharge from in-patient care. The patient should be reviewed immediately after discharge from in-patient care and on-going review should be at 3 monthly intervals (or more frequently if indicated) for at least 2 years, and less frequently thereafter. Overall monitoring should continue for not less than 3 years and in most cases will continue virtually indefinitely, or until the pilot retires. This is because of the significant risk of relapse, which continues for many years following treatment. Review will require supportive, corroborative evidence of continuing abstention from the family, the family doctor and from others in close contact at home or in the workplace. At each review blood tests should be repeated as support for the monitoring process (see above).

Continued attendance at Alcoholics Anonymous or an equivalent organisation is required in most cases. It is also desirable that a peer group member on the same aircraft fleet should act as a “buddy” to supervise the individual’s progress and report to the relevant authority at intervals.

Treatment goals. Total abstinence will usually be the only acceptable treatment goal. For less serious cases (e.g. an elevated GGT with no other evidence of problems arising from alcohol consumption), an attempt at controlling drinking may be allowed, and in such circumstances in-patient treatment will not be required. However, this will be the exception rather than the rule and, in cases of doubt, in-patient treatment and abstinence should both be considered essential for recertification.

Certification. At the end of the first four months of treatment, and provided that abstention is secure, the pilot may be allowed to resume his/her flying role but only in a multicrew capacity. A period of at least two years multicrew limitation will be required, assuming good progress, before solo operations will be authorised. Failure to enter the program or to maintain the protocol will lead to continued suspension of the medical certificate.

Recidivism. Recidivists will usually be disqualified from holding an aviation medical certificate and will not be considered for further certification.
### Reinstatement of Aeromedical Certification

Applicants who are disqualified from holding an aviation medical certificate as a result of problematic use of drugs/substances (including alcohol) may subsequently be certified at any class provided they meet the following requirements:

a. The applicant completes a detoxification program (if relevant to the management of the drug/substance condition—eg, alcoholism)

b. The psychiatrist/drug rehabilitation specialist managing the applicant’s case assesses the applicant and provides a report confirming the applicant’s abstinence and prognosis

c. The applicant enters a program of random drug testing/performance assessment at the direction of CASA to confirm continued abstinence.

d. The applicant enters an appropriate peer support program

e. The applicant is regularly reviewed by a psychiatrist/substance abuse specialist and a report is provided to CASA 6 monthly (in the first year).

Applicants will not usually be granted medical certification within 12 months of diagnosis/disqualification for substance abuse. Applicants who have been treated for alcohol related conditions may be considered for medical certification 4 months after detoxification is complete.

### Recidivism

Recidivists will usually be disqualified from holding an aviation medical certificate and will not be considered for further certification.
2.6.9 Schizophrenia and Psychotic Disorders

These disorders are grouped together as they frequently include psychotic symptoms as a prominent aspect of their presentation (“psychotic” refers to an “inability to test reality” as evidenced by the presence of delusions, prominent hallucinations, disorganised speech, disorganised or catatonic behaviour).

An established history of schizophrenia or psychotic disorder is an absolute contraindication to aeromedical certification of pilots and ATCs. Occasionally aircrew who can unequivocally be established to have experienced a temporary psychotic episode which, has ceased and is reasonably expected never to recur (e.g. psychosis secondary to an organic, toxic or metabolic cause) may be considered for certification. In such cases, certification will be based on psychiatric and other expert advice on the risk of recurrence.

Applicants and licence holders rarely inform CASA when they are diagnosed with schizophrenia or other psychotic illnesses. Such individuals may have little insight into their illness and may attempt to continue flying/controlling. DAMEs and other medical practitioners who are aware of a patient who holds a pilot or ATC licence and who is suffering from a psychotic illness should immediately notify CASA’s Aviation Medicine Section and, where appropriate, notify the medical certificate holder that this is being done. While this may be personally difficult, the risk posed to the safety of the public as well as to the individual by a psychotic medical certificate holder or applicant is such that notification of CASA is entirely appropriate. The Civil Aviation Regulations and the Civil Aviation Safety Regulations indemnify any medical practitioner who acts in good faith in such circumstances.
2.6.10 Mood Disorders

**Major Depression**

Major depressive disorder is characterised by a clinical course involving one or more episodes of major depression without a history of manic, mixed or hypomaniac episodes. Major depressive disorder may have an extremely variable course with some patients experiencing episodes of severe depression separated by long periods without depressive symptoms of any sort, while other patients are entirely debilitated by their almost unrelenting condition. At least 60% of individuals who have a single episode of severe depression will experience further episodes, and 90% of individuals who have had three episodes of severe depression will have subsequent episodes. A significant aeromedical concern is the high mortality associated with this condition, as up to 15% of patients with major depression die by suicide.

However, major depression is also commonly relatively mild in its manifestation and readily treated. Assessment of the aviation risk is thus problematic and is based on considerations such as the worst state the patient has experienced during an episode and the suicide/homicide risk during their worst state. The presence of a significant risk at any time during the course of a depressive illness will be disqualifying for pilots and ATCs. A specialist psychiatric opinion should be sought in any case where there is uncertainty about patient status.

**Bipolar I Disorder (Mania with/without Major Depression)**

The essential feature of this disorder is a clinical course characterised by the occurrence of one or more manic episodes or mixed episodes. More than 90% of individuals who have an episode of mania will go on to have future episodes. Such individuals frequently suffer one or more episodes of major depression or other psychiatric co-morbidities. Completed suicide occurs in 10-15% of such patients.

Bipolar disorder is disqualifying for pilots and ATCs.

**Bipolar II Disorder (Hypomania with Major Depression)**

The essential feature of this disorder is a clinical course characterised by the occurrence of one or more major depressive episodes accompanied by at least one hypomaniac episode.

Bipolar disorder is disqualifying for pilots and ATCs.
Cyclothymic Disorder (Numerous Brief Episodes of Hypomania and Minor Depression)

The essential feature of cyclothymic disorder is a chronic fluctuating mood disturbance involving numerous periods of hypomaniac symptoms and numerous episodes of depressive symptoms over a period of years (where neither hypomaniac nor depressive symptoms are severe or prolonged enough to meet diagnostic criteria for a manic depressive episode). Cyclothymic disorder usually begins insidiously in adolescence and has a chronic indolent course into adulthood. Approximately 15% of sufferers will subsequently develop Bipolar I or II disorder.

Dysthymic Disorder (Prolonged Minor Depression without Mania/Hypomania)

The essential feature of dysthymic disorder is a chronically depressed mood that occurs on most days for several years. Affected individuals describe themselves as being chronically sad or “down in the dumps”. During periods of depressed mood, additional symptoms of depressed appetite, sleep disturbance, low energy levels, low self-esteem, poor concentration and feelings of helplessness may be present. Up to 75% of patients with dysthymic disorder will develop major depression within 5 years.

Pilots and Air Traffic Controllers with dysthymic disorder will not be certificated while they are symptomatic. On remission of symptoms, successfully treated applicants with a good prognosis may be certificated on the basis of a report from a consultant psychiatrist that indicates that the applicant is in remission and at low risk of behaviour that may compromise aviation safety.
Use of Antidepressant Medication by Depressed Pilots and Air Traffic Controllers

CASA may, on a case-by-case basis, certificate applicants who are prescribed (and are taking) the antidepressant medications Sertraline, Citalopram and Venlafaxine as treatment for their depression. CASA is reviewing the antidepressant Moclobemide for possible approval for use by aviators and ATCs. An “as or with co-pilot” or “with direct air traffic controller supervision” condition, as appropriate, may be imposed. Pilots and ATCs taking other types of anti-depressants will not usually be considered for certification. CASA certification of pilots and ATCs taking CASA authorised medications is conditional on:

- Such applicants being under the care of a medical practitioner experienced in the management of depression—the applicant must:
  - Be stable on an established and appropriate dose of medication for at least four weeks before returning to flying/ATC duties and exhibiting:
    - Minimal acceptable side-effects
    - No drug interactions or allergies
  - Be subject to clinical review monthly or more often, with progress reports to CASA at 6 monthly intervals (for at least the first year). The applicant may be involved in other concurrent treatment (e.g. psychotherapy).
  - Have an absence of other significant psychiatric co-morbidities
  - Have no other psychoactive medications
  - Have precipitating factors removed/controlled.
- Symptoms of depression being well controlled, without evidence of psychomotor retardation
- An absence of suicidal ideation or intent
- An absence of features of arousal (e.g. irritability or anger)
- The presence of a normal sleep pattern.

Pilots or ATCs authorised to fly or perform duties when taking Selective Serotonin Re-uptake Inhibitor (SSRI) or related antidepressant medications must cease exercising the privileges of their licences if their antidepressant medication is altered or the dose changed. Their supervising medical practitioner may return them to duty when they are assessed as stable and without unacceptable side effects.

Pilots and ATCs whose medication is being reduced must cease exercising the privileges of their licences for the entire period during which they are weaned off medication plus an additional period of two weeks. Their supervising medical practitioner may return them to duty when they are assessed as stable and without unacceptable side effects.
2.6.11 Anxiety Disorders

DSM IV has eliminated the term neurosis, and dispersed the diagnoses from this former category of disorders amongst four other headings:

- Mood disorders
- Anxiety disorders
- Somatoform disorders
- Dissociative disorders.

Because panic attacks and agoraphobia may occur in the context of any anxiety disorder as well as in association with other mental disorders, they are defined separately hereunder.

**Panic attacks**

Panic attacks are discrete episodes in which an individual experiences a sudden onset of intense apprehension, fearfulness or terror, often associated with feelings of impending doom. During these episodes, symptoms such as shortness of breath, palpitations, chest pain or discomfort, choking/smothering sensations, and fear of “going crazy” or losing control may be present. Attacks occur suddenly, may be unpredictable and usually build to a maximum within 10-15 minutes. CASA will not usually grant aeromedical certification to an individual who suffers non-specific or unpredictable panic attacks.

**Agoraphobia**

The essential feature of agoraphobia is extreme anxiety about being in places or situations from which escape may be difficult (or embarrassing) or in which help may not be available in the event of having a panic attack. The anxiety typically leads to a pervasive avoidance of a variety of situations. Such avoidance may impair an individual’s ability to work or to carry out other responsibilities. CASA may grant aeromedical certification where an applicant’s agoraphobia is unrelated to the aviation environment or unlikely to affect aviation safety adversely.

**Specific Phobia**

The essential feature of this disorder is a marked and persistent fear of clearly discernible, circumscribed objects or situations. Exposure to the phobic stimulus almost invariably provokes an immediate anxiety response. CASA may grant aeromedical certification where an applicant’s specific phobia is unrelated to the aviation environment or is unlikely to affect aviation safety adversely.
Social Phobia (Fear of Embarrassment)

This condition is marked by a significant and persistent fear of social or performance situations in which embarrassment may occur. Exposure to such situations almost invariably provokes an immediate anxiety response and may reduce an affected individual’s ability to function in social and occupational circumstances. Most sufferers of this condition avoid these social/performance situations but some may endure such situations with dread. CASA will not usually grant aeromedical certification to an individual who suffers from non-specific or unpredictable social phobias.

Obsessive-compulsive Disorder (Obsessive Thoughts and Compulsive Rituals)

Obsessions are persistent ideas, thoughts, impulses or images that are experienced as intrusive and inappropriate and that cause marked anxiety or distress. Compulsions are repetitive behaviours or mental acts whose goal is to prevent or reduce anxiety or distress. In most cases, an individual with a compulsion feels driven to perform a compulsion to reduce the distress that accompanies the obsession or to prevent some dreaded event or situation. Eventually, the sufferer recognizes that the obsession or compulsion is excessive or unreasonable but feels powerless to prevent it. These disorders may cause marked distress, be extremely time consuming or significantly interfere with an individual’s normal social or occupational circumstances. CASA will not usually grant aeromedical certification to an individual who suffers from obsessive-compulsive disorder.

Post-traumatic Stress Disorder (Non-acute Psychological Consequences of Previous Trauma)

The essential feature of Post-Traumatic Stress Disorder (PTSD) is the development of characteristic symptoms following exposure to an extremely traumatic stressor. Such stressors include a personal near death experience, witnessing the severe injury or death of another or the violent or unexpected death of a family member. An individual’s response must involve intense fear, helplessness, or horror. The characteristic symptoms resulting from exposure to the extreme stressor include persistent re-experiencing of the trauma, avoidance of the stimuli associated with the trauma, numbing of general responsiveness and persistent symptoms of increased arousal. PTSD can occur at any age and symptoms generally begin within 3 months of the precipitating event. CASA will not usually grant aeromedical certification to an individual who is suffering from acute symptoms of PTSD. Certification may be considered once an individual’s symptoms are controlled and the applicant is considered to pose no threat to the safety of air navigation.
Acute Stress Disorder

This condition is characterised by the development of anxiety, dissociative or other psychological symptoms within one month of exposure to an extremely traumatic stressor. Generally symptoms of acute stress disorder begin shortly after exposure to the stressor, peak after 2-5 days, and resolve within a month (otherwise the diagnosis should be changed). CASA will not usually grant aeromedical certification while individual is experiencing an acute stress reaction. Once the condition has resolved, return to flying or ATC duties is likely.

Generalised Anxiety Disorder

In this disorder an individual is afflicted by excessive anxiety about a number of events or activities. The symptoms occur on the majority of days and the individual finds it difficult to control the symptoms. The anxiety and worry are accompanied by one of more of the following:

- Restlessness
- Easy fatigability
- Difficulty concentrating
- Irritability
- Muscle tension
- Disturbed sleep.

Many individuals suffering generalised anxiety disorder report they have been nervous and anxious all of their lives. The clinical course is chronic and fluctuating. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.
2.6.12 Somatoform Disorders

The common feature of this group of disorders is the presence of physical symptoms that suggest an underlying physical condition, but are not explained by that medical condition. The symptoms cause clinically significant distress or impairment in social, occupational or other areas of functioning and are not intentional.

**Somatization Disorder**

In somatization disorder, the patient experiences multiple symptoms including pain, gastrointestinal symptoms, sexual dysfunction and pseudo-neurological symptoms over several years. Characteristically, this disorder begins before the age of 30 and has a chronic fluctuating course that rarely remits completely. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Undifferentiated Somatoform Disorder**

The essential feature of this disorder is the presence of one or more physical complaints that persist for six months or longer. Symptoms include chronic fatigue, loss of appetite, gastrointestinal or genitourinary symptoms. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Conversion Disorder**

This disorder involves unexplained symptoms or deficits affecting voluntary motor or sensory function suggesting a neurological or other general medical condition. Psychological factors are judged to be associated with the symptoms or deficits. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Pain Disorder**

In pain disorder, the predominant focus of clinical attention is pain. Psychological factors have an important role in the severity, exacerbation or maintenance of this disorder. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Hypochondriasis**

This condition is the preoccupation with the fear of having, or the idea that one has, a serious disease based on a patient’s misinterpretation of bodily symptoms or functions. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.
Body Dysmorphic Disorder

This condition is the preoccupation with an imagined or exaggerated defect in physical appearance (in contrast to anorexia and bulimia where the morbid focus is on body weight). CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

2.6.13 Factitious Disorders

Factitious disorders are characterised by physical or psychological symptoms that are intentionally produced or feigned in order to assume a “sick role”. In contrast to malingering, the motivation of sufferers of factitious disorders is psychological and there is an absence of external incentive for the behaviour. Other psychiatric co-morbidities are frequently present. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

2.6.14 Dissociative Disorders

The essential feature of this group of disorders is a disruption in the integrated functions of consciousness, memory, identity or perception. The disturbance may be sudden or gradual in onset, and may be transient or chronic. Dissociative amnesia, dissociative fugue, dissociative identity disorder, and depersonalisation disorder are included in this group of disorders. CASA will not usually grant aeromedical certification to an individual who suffers from these conditions. Aeromedical certification may be considered should the condition resolve.
2.6.15 Sexual and Gender Identity Disorders

**Sexual Dysfunctions**

This group of disorders is characterised by disturbance in sexual desire and in the psychophysiological changes that characterise the normal human sexual response. They may cause marked distress and interpersonal difficulty. In general, these disorders are not of aeromedical concern unless the associated psychological distress intrudes on an individual’s ability safely to control and aircraft or perform duty as an ATC.

**Paraphilias**

The essential feature of this group of conditions is recurrent, intense, sexually arousing fantasies, sexual urges or behaviours involving non-human objects, the suffering of oneself/others, or the non-consensual participation of others in such activities. Affected individuals are rarely self referred and usually come to attention when their behaviour has brought them into conflict with their sexual partners, society, or has reduced on their social, occupational or other areas of functioning.

Affected applicants will not usually be aeromedically certificated until the issues that brought them to attention have been resolved. Successfully treated applicants with a good prognosis may be certificated on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.

**Gender Identity Disorders**

Patients with gender identity disorder experience strong and persistent cross-gender identification and a persistent discomfort about their assigned sex. The diagnosis depends on evidence of clinically significant distress or impairment in social, occupational or other areas of functioning.

Affected applicants will not usually be aeromedically certificated until the source of the distress or impairment is dealt with, and if appropriate, gender reassignment has been completed. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.
2.6.16 Eating Disorders

**Anorexia Nervosa**

The essential features of this condition are refusal to maintain a minimally normal body weight, intense fear of gaining weight, and significant disturbance in perception of shape/size of the body. Restrictive and binging/purging subtypes of this condition are identified. Many persons with anorexia nervosa exhibit depressive symptoms, others may be obsessive-compulsive, while others may have feelings of ineffectiveness, a strong desire to control the environment, inflexible thinking, limited social spontaneity, perfectionism, restrained initiative and depressed emotional expression. While some persons recover from anorexia completely, others have a relapsing course and the overall mortality of this condition approaches 10%.

CASA will not usually aeromedically certificate applicants who are actively anorexic. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.

**Bulimia Nervosa**

The essential features of this condition are binge eating and use of inappropriate compensatory methods to prevent weight gain. Persons with bulimia also place an excessive emphasis on their body shape. They are frequently depressed or suffer mood disorders and many also meet the criteria for the diagnosis of personality disorder. The lifetime prevalence of substance abuse disorders involving alcohol or stimulants is at least 30% among persons with bulimia.

CASA will not usually aeromedically certificate applicants while they are actively bulimic. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.
2.6.17 Sleep Disorders

**Primary Sleep Disorders**

This group of disorders includes the dyssomnias (including insomnia, hypersomnia and narcolepsy which are characterised by abnormalities in the amount, quality or timing of sleep) and the parasomnias (characterised by abnormal behavioural or physiological events occurring in association with sleep). Of primary aeromedical concern is the failure of sufferers from these conditions to gain sufficient restorative sleep to ensure optimum alertness and cognitive function when performing duties as pilots and ATCs. Applicants for aeromedical certification will only be considered if studies confirm normal alertness during waking hours (with or without treatment). (Also see Section 2.3 Medical Aspects – Respiratory Disease.)

2.6.18 Impulse Control Disorders

The essential feature of impulse control disorders is failure to resist an impulse, drive, or temptation to perform an act that is harmful to the person or to others. CASA will not usually grant aeromedical certification to individuals who are diagnosed as suffering from such disorders.
2.6 Psychiatry

2.6.19 Adjustment Disorders

An adjustment disorder may be identified when a person, within three months of an event or stress, develops clinically significant emotional or behavioural symptoms. Such symptoms are either greater than would be generally expected, given the nature of the stressor, or lead to significant impairment in social, educational or occupational function. Stressors may be single or multiple, recurrent or continuous, and may affect either a single person or a group. Patients with adjustment disorders may experience symptoms of depression, anxiety, or may manifest disturbances of conduct. Adjustment disorders generally have a good prognosis and usually remit within six months of the stressor or its consequences ceasing.

Pilots or ATCs should not exercise the privileges of a licence whilst suffering symptoms of an acute adjustment disorder. In some cases, a medical certificate may be suspended. Once psychiatric opinion confirms that the symptoms associated with the adjustment reaction have abated and the acute stressor has been removed or overcome, CASA will usually issue an unrestricted medical certificate.

Personality Disorders

Personality disorders are characterised by enduring patterns of thought and behaviour that deviate markedly from the expectations of a person’s culture. These patterns, which usually begin in adolescence or early childhood, are pervasive, frequently inflexible, stable over time and cause distress, social impairment and often occupational difficulties. A number of specific personality disorders are identified including: antisocial personality disorder; (impulsive, aggressive, manipulative); borderline personality disorder (impulsive, self-destructive; unstable), dependent personality disorder (dependent, submissive, clinging); Histrionic personality disorder (emotional, dramatic, theatrical); narcissistic personality disorder (boastful, egotistical, "superiority complex"); obsessive-compulsive personality disorder (perfectionist, rigid, controlling); paranoid personality disorder (suspicious, distrustful); and, schizoid personality disorder (socially distant, detached), etc.

While personality traits are unique and may enable a person to excel in a particular field, individuals with identifiable personality disorders are likely to have attitudes or perform acts that may be prejudicial to flight safety. Such individuals fail to meet CASA’s psychiatric medical standards and will usually be disqualified from aeromedical certification. Certification may be considered if specialist psychiatric opinion confirms that a pilot or ATC with a personality disorder represents a low risk to aviation safety.
2.6.20 Other Psychiatric Conditions which may be the Focus of Clinical Attention

**Suicidal Ideation or Gesture**

Suicide and attempted suicide are not psychiatric diagnoses per se, but rather symptoms of underlying psychiatric disease. Furthermore, it is uncommon for an individual to use an aircraft as a means of committing suicide.

Those who commit suicide are more often male. The act is carefully planned, precautions taken against discovery, and the method is often violent. The majority of those who suicides are suffering from a depressive disorder, many having significant social problems, and alcohol misuse is a feature in about 15% of cases. In the younger age groups personality disorders are frequently diagnosed, because they are often associated with alcohol or drug misuse, and adverse social factors. Deliberate self-harm is usually an impulsive act, committed in such a way as to invite discovery. Over dosage with minor tranquillisers, antidepressants and non-opiate analgesics is common. Frank major psychiatric illness is uncommon.

In assessing potential risk the following factors should be considered:

- A history of direct statement of intent
- A history of previous self harm
- A previous or current depressive disorder, particularly in the early phase of recovery
- Alcohol dependence, particularly with severe physical or social complications
- Drug dependence
- Social deprivation or loneliness.

Certification may be considered if specialist psychiatric opinion confirms that a pilot or ATC who has attempted or considered suicide represents a low risk to aviation safety. Applicants who have a history of multiple suicide attempts will not usually be granted a medical certificate.
Fear of Flying

DSM IV identifies as a true simple phobia the overt, unabashed, and long-standing fear of flying which usually occurs in people who are not aviators. When an experienced aviator who previously enjoyed flying presents with “fear of flying” it may represent a complex mix of more acute causes and symptoms’ presentations. In such fearful fliers, anxiety about symbolic threats may overlay a rational fear of actual risks; this may represent a reaction to a near or actual accident, or displaced anxiety from a personal crisis. If the flier is not consciously aware of the fear, the focus may be on vague or trivial somatic symptoms, presented in a setting of "I'd like to fly, but—." This attitude presents a striking clinical contrast to the more usual tendency of fliers to understate, if not actually deny, signs and symptoms that they believe may disqualify them from medical certification.

An episode of spatial disorientation or of hyperventilation in flight may trigger intense symptoms of anxiety. Loss of motivation to fly may undermine previously adequate means of coping with the true dangers of flight, particularly in professional aviators. An accident involving the flier or a friend may overwhelm mental defences against such a possibility. Interpersonal conflicts with significant individuals in a non-aviation setting (home, office) may precipitate aviation-related anxieties without any obvious connection to flying except the time of onset.

Whatever its genesis, CASA will not medically certificate a pilot who suffers symptomatic fear of flying until its causes are delineated and the fear has been successfully treated.
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2.7.1 Introduction

This section details the assessment of pilots, other aircrew members and Air Traffic Controllers (ATC) who suffers or who may suffer from renal disease or from urological disorders.

The aim of the renal assessment within the aeromedical examination is to ensure that applicants do not suffer from renal or urological conditions which place them at an increased risk of incapacitation or which may produce a decrement in physiological or psychological function sufficient to jeopardise the safety of air navigation. In conducting the aeromedical examination, the DAME will recognise that an individual who holds an unrestricted medical certificate must be capable of performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities may include flight (either as a private or professional pilot):

- For prolonged duration, often as part of a shift roster
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning, and
- Subject to disrupted sleep and time zone changes.

A number of these stressors may also affect ATCs.
2.7.2 Urinary Standard – CASR Part 67

The urinary standards are found in the following paragraphs of CASR Part 67:

- **CASR 67.150** For medical standard 1
  - Table 67.150
  - 1.19 – 1.22

- **CASR 67.155** For medical standard 2
  - Table 67.155
  - 2.18 – 2.21

- **CASR 67.160** For medical standard 3
  - Table 67.160
  - 3.17 – 3.20

2.7.3 Dipstick Testing

**Haematuria**

Urinary ‘dipstick’ testing is required as part of the routine aeromedical examination to screen for the presence of haematuria. Approximately 2-5% of the population have microscopic haematuria, but only about 0.5% who are under age 70 will have a urinary tract cancer as the cause. A positive dipstick test should be repeated, and if negative, managed expectantly. (Most of these applicants will have a minor glomerular lesion.)

Initial aeromedical management of an applicant with a persistently positive dipstick test involves obtaining phase contrast microscopy of a fresh mid-stream urine sample. The sample must be examined within two hours of being passed; thus individuals more than two hours from a suitable pathology service must travel to a location that has that capability. Because of wide variation between laboratories in reporting urine abnormalities, CASA’s relevant requirement for a ‘normal’ assessment in an applicant found to have microscopic haematuria is for three separate urine tests, all of which have less than 20,000 RBC per ml. Phase contrast microscopy of specimens with crenated cells up to 10,000 per ml, indicating a glomerular origin, are considered to be within normal limits. Cells with a ‘non-glomerular’ appearance are likely to indicate a urothelial problem.

Where there is ‘significant haematuria’ (more than 20,000 RBC per ml in any test), initial urogenital imaging is to be by Ultrasound or Intravenous Pyelogram (IVP), as some 10% of all stones are radiolucent. The requirement for further investigation should be determined on clinical grounds and on the basis of investigation results.
**Proteinuria**

Orthostatic proteinuria can be excluded by testing an early morning urine specimen. If an early morning specimen remains positive for protein, then a 24-hour urine protein estimation is required. Normal is <150mg protein/day.

### 2.7.4 Urinary Calculi

There have been no reported episodes of incapacitation involving CASA certificate holders with a known history of renal calculi. However, there have been several untoward incidents as a result of undiagnosed or unreported stone. The aviation environment may predispose aircrew to stone formation due to the low humidity environment often found in aircraft cockpits, and because of a tendency for some pilots deliberately to under-hydrate to avoid the need to urinate, particularly where there is no toilet on the aircraft.

The presence of any stone or stones in the urinary system is aeromedically significant. (For CASA certification purposes, there is no such entity as an asymptomatic stone). Renal stones as small as 1-2 mm diameter can and do cause significant symptoms. There are no reliable prognostic indicators that can determine if a stone will or will not cause symptoms, and the chance of a stone present for 10 years moving in the subsequent 24 hours is the same as it moving after being present for 10 days. The time a stone has been present is not a reliable indicator of risk.

**Single Renal Stone (Passed or Removed)**

In applicants who have had a single episode of renal colic, about 50% will have a repeat episode within 5-7 years, and nearly 100% within 12-15 years, unless they modify their behaviour. However, for applicants who have passed all stones or had them removed and who are able to maintain adequate urine flow (>2 litres/day), the risk of stone recurrence is the same as for the general population. Thus CASA will certificate pilots and ATCs who have experienced a single episode of renal stone disease, with successful removal or passage of the stone. In such cases, the only surveillance need be by urine dipstick at routine CASA medical examinations.

**Recurrent Renal Stones (Passed or Removed)**

Pilots and ATCs who have experienced recurrent episodes of renal stone disease may be recertificated once they are proven to be free of all stones in the kidney or renal tract, have normal renal function and have adopted appropriate risk minimisation behaviour. CASA will require the following annual investigations and reports in these cases:

- Plain abdominal X-ray or ultrasound
- 24-hour urine calcium and urate estimations
- Urological review.
Retained Renal Stones

Where stone material remains in the renal substance or urinary tract, CASA will not permit unrestricted Class 1 or Class 3 certification unless there are clear mitigating factors that preclude renal colic, such as a staghorn calculus, a calculus in a diverticulum, or a stone clearly embedded in the renal substance. (Further stone movement is extremely unlikely in such cases.) Pilots or ATCs with staghorn calculi many be suitable for certification, on a case-by-case basis, until stone removal, provided they are asymptomatic, their renal function is normal, and movement of the calculus is considered unlikely. CASA may entertain unrestricted certification for Class 2 applicants in similar circumstances, on a case-by-case basis, and subject to annual urological review.

Approximately 20% of patients will have residual calculi three months after undergoing Extracorporeal Shockwave Lithotripsy (ESWL). Where there is a small stone or remnant following attempted removal with ESWL, generally accepted management is to leave the stone alone. However, due to the risk of inflight incapacitation with residual stone fragment movement, it may be worthwhile to offer removal of stone remnants via flexible ureteroscopy. There is currently an approximate 50% success with this procedure, but its risks include urine extravasation, which can be extremely painful. Percutaneous nephrolithotomy (PCNL) may be a better option for pilots to ensure a stone free status.

2.7.5 Medullary Sponge Kidney

Persons with medullary sponge kidneys (MSK) tend to be chronic renal stone formers. Therefore, most applicants for pilot or ATC certification who have MSK will not be issued an aviation medical certificate of any kind. However, CASA may certificate pilots or ATCs with this condition, on a case-by-case basis, if they have a history of one episode of renal colic or fewer, and if there are no residual stones demonstrated on investigation. (Beware of the applicant with only a radiological diagnosis of MSK and no history of stones or calcification. Many such persons have only a prominent medullary blush with no adverse implications for aeromedical certification.)
2.7.6 Glomerulonephritis

**Thin Membrane Disease**

Thin membrane disease (TMB) is due to a type IV collagen genetic defect and occurs predominantly in females. It has no major health implications and is considered benign for the purpose of CASA aeromedical certification. Patients with TMB often have an incidental finding of 80,000-100,000 RBC per ml of urine, but further investigation reveals no other abnormalities. If blood pressure is normal and renal function tests are normal (including 24-hour urinary protein excretion and 24-hour creatinine clearance), CASA will accept a presumptive diagnosis of TMB and will not require further investigation. While biopsy may be offered to confirm the diagnosis of TMB, such an investigation is not required for aeromedical certification.

Where TMB is confirmed by biopsy, there is no requirement for any surveillance. In the case of a presumptive diagnosis, the result of a serum creatinine study is required with every subsequent CASA medical examination.

**IgA Nephropathy**

This condition was formerly considered to be benign, but it is now clear that it may later lead to renal failure in some persons. Risk of disease progression is greater when it is associated with hypertension, abnormal renal function test results and renal scarring, detected on biopsy. In the absence of such abnormalities, the risk of renal failure in cases of IgA nephropathy is about 1% after 20 years. The condition is of aeromedical concern because of the risk associated with subtle incapacitation due to circulating toxins produced as renal failure progresses. Rapid progression to nephrotic syndrome may also occur. CASA will usually certificate pilots and ATCs who are affected by IgA nephropathy. Required surveillance measures are:

- 24-hour urine protein estimations
- Serum albumin testing
- Renal function testing.

All of these tests are to be done at six-monthly intervals.
2.7.7 Nephrotic Syndrome

Many persons affected by this condition recover spontaneously, while others respond well to treatment with steroids. If immunosuppression is necessary for treatment, pilots and ATCs may not exercise the privileges of their licences until treatment is complete. CASA will consider recertification once the condition has resolved, medication has been ceased and renal function has returned to an acceptable level (defined as protein excretion <3g per day).

2.7.8 Renal Failure

For aeromedical certification purposes, renal failure is defined by biochemical markers of impaired renal function. Physical symptoms of renal failure occur late in this disease and represent manifestations of severe end stage renal failure.

The main marker of renal function is the serum creatinine level. Most persons with chronic renal impairment who have a creatinine level <200 micromol/L suffer no untoward effects. (However, DAMEs should recall that a creatinine level <200 micromol/L may evoke severe symptoms in cases of acute renal impairment). Where an applicant’s creatinine level is between 200 and 500 micromol/L, the DAME’s clinical acumen will be required to determine fitness for exercise of licence privileges. A creatinine above 500 micromol/L invariably produces untoward health effects, including:

- Slowed mentation
- Poor concentration
- Lethargy
- Gastrointestinal disturbance
- Other electrolyte disturbances
- Rapid deterioration with intercurrent illness.
Aeromedical Disposition

When there are three test results of >500 micromol/L creatinine, the DAME should advise the applicant not to exercise the privileges of his/her licence and inform CASA of the details. Following a single initial test result of >500 micromol/L creatinine, the certificate holder should be advised not to exercise privileges, and a further test arranged for 48 hours later. If the second test confirms the original result, a third test is required 48 hours later again. The DAME should inform CASA Aviation Medicine Section of the results, and CASA will usually suspend the applicant’s medical certificate. For reported creatinine levels between 200-500 micromol/L, the DAME will consider the possible effect on safe aviation of symptoms such as those listed above, and either advise the applicant accordingly or discuss the matter with CASA Aviation Medicine Section.

Acute renal impairment is usually associated with a significant insult which itself precludes a medical certificate holder from flying or controlling. Once recovered from the precipitating cause of acute renal failure, CASA will consider recertification on a case-by-case basis.

Renal Dialysis

Persons undergoing renal dialysis usually have significantly high creatinine levels, even soon after completing a dialysis session. Their electrolyte levels may be abnormal because of large fluid shifts that accompany dialysis. Consequently, persons undergoing renal dialysis may remain symptomatic for several hours following dialysis. CASA will not usually certificate pilots or ATCs with chronic renal failure who are undergoing dialysis (of any type). Very well controlled pilots and ATCs may be granted special certification, on a case-by-case basis, permitting exercise of privileges in the period between 12 and 36 hours (only) following a dialysis.

Renal Transplant

Following renal transplantation, most recipients receive immunosuppressants to prevent tissue rejection. They have increased risks of hypertension and of ischaemic heart disease, also of developing carcinoma. Some transplant recipients have minimal complications and normal renal function. CASA will not consider aeromedical certification for pilots or ATCs until 12 months following transplantation. If the applicant is then receiving standard immunosuppressant therapy, has well controlled blood pressure, and renal function is at an acceptable level, CASA, may consider recertification, on a case-by-case basis.
2.7.9 Single Kidney

If an applicant has a single kidney and this condition is developmental, renal function testing should be undertaken. If this is normal, aeromedical certification will be unaffected. If an applicant has a single kidney due to nephrectomy, the cause of the kidney’s removal must also be considered. If the underlying cause does not affect certification, then the same considerations of renal function testing and aeromedical disposition apply as for developmental variations.

2.7.10 Urinary Tract Infections

Female

In the young adult female, isolated urinary tract infection (UTI) is common. Investigation rarely reveals a specific cause. A small percentage of women will develop chronic or recurrent UTIs. They require investigation (including IVP) to exclude underlying anatomical causes. Some of them may need antibiotic cover for extended periods and/or post coital antibiotic prophylaxis. Female applicants receiving antibiotic treatment for recurrent UTIs are unlikely to adversely affect the safety of air navigation, and there need be no restrictions on their aeromedical certification.

Male

A UTI in a male usually indicates the presence of an anatomical abnormality in the urinary tract. The diagnostic yield from investigations is about 50%. Adequate investigation must include IVP and cystoscopy. Future aeromedical certification will depend on the findings from investigations.

2.7.11 Prostatitis

Acute bacterial prostatitis should be managed as an acute intercurrent illness (like UTI) and the pilot or ATC returned to duty only when fully recovered. Non-bacterial or chronic prostatitis is considered to be a form of pelvic pain syndrome, often accompanied by significant psychological overlay, analogous to the findings in Irritable Bowel Syndrome. Chronic prostatitis is often distracting and may be difficult to manage. Best pharmacological management is with anti-inflammatory and/or anti-depressant medications. CASA will determine future aeromedical certification of affected applicants on a case-by-case basis. The DAME should closely assess the psychological status of any affected pilot or ATC before making a recommendation concerning aeromedical disposition.
2.7.12 Urinary Outflow Obstruction

Benign prostatic hypertrophy (BPH) is the commonest cause of outflow obstruction in Australian males. Acute urine retention occurs in persons affected by BPH at the rate of 5-8% per annum. There is also a small risk of chronic incapacitation due to reduced renal function.

An acute retention episode may be treated by surgery, or by use of an alpha-blocker medication. Successful surgery will usually result in clearance to return to flying or controlling as soon as the applicant has fully recovered from the effects of the surgery. Note that alpha blockers may reduce G-tolerance—the more specific the drug, the better tolerated. Tamsulosin or alfalfusin are highly selective, but are seldom prescribed in Australia as they are not currently listed on the PBS. Prazosin is listed on the PBS, but is less selective than other available agents and has more side effects. Prazosin use is not compatible with agricultural or aerobatic flying, and medical certification for pilot applicants using it will contain appropriate restrictions.

2.7.13 Testicular Cancers

Also see Section 2.14, Malignancy.

Teratoma

The progress or recurrence of teratomas may be determined by use of an appropriate marker. Chemotherapy is the usual treatment and there is >90% cure rate. When the applicant has a stage A tumour and markers are normal, early return to duty may be possible. For stage B tumours, where adequate treatment requires 3-4 cycles of chemotherapy, return to duty will be delayed until at least three months after completion of chemotherapy. All such cases should be referred to CASA Aviation Medicine Section for determination of aeromedical disposition.

Seminoma

Seminomas are very sensitive to radiation, and a very low radiation dose may be curative. As there is no reliable marker available at present, surveillance can be difficult. Once treatment is complete, early return to duty may be possible. All such cases should be referred to CASA Aviation Medicine Section for determination of aeromedical disposition.
2.7.14 Prostatic Carcinoma

Prostate Specific Antigen (PSA) is a very reliable marker for progress of established prostatic cancer. However, it is unreliable as a screening test and there is still no normal range defined for it. Risk of prostate cancer against PSA may be graphed, and most laboratories recommend further investigation when a PSA is >4, but positive predictive value is poor at this level. Once PSA reaches 12, the PPV is close to 1.

In established disease, the PSA is a proxy measure of prostate bulk and of cell turnover. PSA levels >50 are associated with a significant risk of pathological fractures, cerebral and other metastases. However, applicants with prostate cancer and a PSA of <30 have a positive bone scan in <1% of cases. An applicant with PSA of <20 will have cancer mass of only a few grams, while a PSA <12 is not associated with significant risk of metastases.

Aeromedical Certification

Post-radical prostatectomy, if the operation has been successful, PSA should fall to undetectable level. If the level remains undetectable at three years post surgery, there is <5% chance of recurrence of disease. In such circumstances, applicants can be considered cured after four years. Radiotherapy now produces similar outcomes and if PSA remains at nadir levels for 3-4 years following radiotherapy, a similar assessment may be made. Usually, certification for all classes of medical certificate may be possible 3-4 months post surgery or after completion of radiotherapy. CASA will require annual follow up urological reports and PSA estimations. However, if the PSA remains undetectable five years after surgery, no further reports will be required.

Pilots and ATCs with advanced prostatic cancer and PSA >30 must also undergo bone scan as part of their required investigations. CASA will usually only contemplate certification for this group on the basis of ‘as-or-with co-pilot’ or ‘as-or-with second controller only’.

Treatment with anti-androgen therapy produces significant side effects in about 10-20% of cases, particularly lethargy. LHRH agonists may rarely cause a chronic confusional state. Prior to return to duties, an applicant receiving anti-androgen therapy will require an operational check. (Also see Section 2.13, Medication – Drugs and Flying / Controlling.)
2.7.15 Renal Cell Carcinoma

Cerebral spread from a renal cell carcinoma is highly likely. Previously, this cancer has usually been detected late, and affected persons have had poor survival rates. However, recently these tumours have often been detected incidentally by ultrasound. 80% of these tumours are now <5cm in diameter when found, and five-year survival in those affected persons is >90% following treatment. Even for larger tumours (<10cm), five-year survival is >70% following treatment.

Aeromedical certification

As the outcome of renal cancer is unpredictable, and as cerebral metastases are common, CASA will determine aeromedical disposition of pilots and ATCs with this condition on a case-by-case basis. If granted, initial certification is likely to be ‘as-or-with co-pilot’ or ‘as-or-with second controller only’. Certification will not be granted until at least six months following completion of treatment. Unrestricted class 1 certification will not be considered until at least three years post treatment. Class 2 applicants will be considered for unrestricted certification after two years, and Class 3 applicants after one year. CASA requires follow up investigations as follows:

- Six-monthly CT scans for Class 1 applicants
- Annual CT scans for class 2 and 3 applicants.

In all cases, additional investigations must include Full Blood Examination (to exclude polycythaemia), Liver Function Tests, and Urea and Electrolyte estimations.

After 10 years without recurrence of tumour following treatment, an applicant may be deemed ‘cured’. Thereafter, no additional surveillance measures will be required.
2.7.16 Polycystic Kidneys

Polycystic kidneys (PCK) may be associated with several complications that could adversely affect the safety of air navigation. These include acute pyelonephritis, haemorrhage into cysts, renal stones, berry aneurysms and cardiac valvular disease. However, most persons with polycystic kidneys do not experience these complications. The commonest side effect of the condition is hypertension, usually readily controlled by medication. Due to the statistical association of polycystic kidneys with berry aneurysm, all applicants with known PCK must provide the result of a recent Magnetic Resonance Angiogram (performed within 12 months). If this is normal, CASA will usually approve medical certification. However, the test must be repeated and results provided to CASA at intervals of five years while medical certification is maintained. If the DAME detects any cardiac murmur when examining an applicant with PCK, CASA requires an echocardiogram and report for initial certification. This is also the case when any new murmur is noted.

2.7.17 Amyloid

This is a systemic disease with possible renal, neuropathic and cardiological manifestations. On diagnosis of the condition, inform CASA Aviation Medicine Section and advise the applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA. Following appropriate investigations, CASA will determine aeromedical disposition on a case-by-case basis.
2.8.1 Gynaecological and Obstetric Standard – CASR Part 67

The gynaecological and obstetric standards are found in the following paragraphs of CASR Part 67:

- **CASR 67.150** For medical standard 1  
  CASR 67.150(7)  
  Table 67.150  
  1.23 – 1.24

- **CASR 67.155** For medical standard 2  
  CASR 67.155(7)  
  Table 67.155  
  2.22 – 2.23

- **CASR 67.160** For medical standard 3  
  CASR 67.160(7)  
  Table 67.160  
  3.21 – 3.22

2.8.2 Severe Menstrual Disturbances

Applicants with a history of severe menstrual disturbances resistant to treatment must be assessed with caution. Such applicants are likely to be unacceptable for issue of a Class 1 or Class 3 Medical Certificate.

2.8.3 Pregnancy

Pregnancy, particularly during the final trimester, is a cause of temporary unfitness to exercise the privileges of all aviation licences. However, where the obstetrician or other medical practitioner supervising the pregnancy certifies that an applicant or medical certificate holder has no significant medical contraindications related to the pregnancy, she may be assessed as meeting the appropriate medical standard(s). The exercise of licence privileges in such circumstances may involve imposition of appropriate, individually determined operational restrictions.

The risk of acute incapacitation from premature labour exceeds 1% after 30 weeks gestation. Consequently, all medical certificate holders are advised not to exercise licence privileges after 30 weeks gestation.

Class 1 and 2 medical certificate holders are formally deemed medically unfit to exercise licence privileges from 30 weeks gestation until cleared by a post-partum assessment conducted in accordance with the last paragraph in this section.
Class 3 medical certificate holders may exercise relevant licence privileges until 34 weeks gestation provided that:

i. The obstetrician or other medical practitioner supervising the pregnancy certifies that the licence holder is fit for duties during this period; and

ii. Suitable administrative arrangements are made which ensure that sudden incapacitation of an affected licence holder due to premature labour will not adversely affect the safety of air navigation.

Thereafter, Class 3 medical certificate holders also are formally deemed medically unfit to exercise licence privileges until cleared by a post-partum assessment conducted in accordance with the following paragraph.

Following delivery, applicants are required to obtain a clearance from a DAME before once again exercising the privileges of an aviation licence. Depending on the stage of a pregnancy at which the event occurs, such clearance may also be required following a miscarriage, stillbirth or termination of pregnancy. Pregnancy is considered a medically significant condition and DAMEs should remind pregnant applicants of their obligations under CASRs to refrain from exercising their licence privileges until medically cleared. (See also 1.4.5 Temporary Incapacity of Certificate Holders.) Following a normal delivery, clearance to resume flying duties should be appropriate at six weeks post-partum.
2.9.1 Introduction

There is a very wide range of conditions of the gastrointestinal tract and associated organs that may have aviation safety implications. The greater majority are compatible with certification after appropriate assessment and management. This section provides guidance on common conditions of the gastrointestinal tract, liver and pancreas that may be presented to a DAME. It does not cover GI malignancy. All malignancy related advice is addressed in the Section 2.14 Malignancy of this handbook.

2.9.2 Alimentary System Standard – CASR Part 67

CASR 67 The alimentary system standards are found in the following paragraphs of CASR Part 67:

- CASR 67.150 For medical standard 1 CASR 67.150(7), Table 67.150 1.14
- CASR 67.155 For medical standard 2 CASR 67.155(7), Table 67.155 2.13
- CASR 67.160 For medical standard 3 CASR 67.160(7), Table 67.160 3.13

2.9.3 Gastro-Oesophageal Reflux Disease (GORD)

GORD is a very common condition. GORD and Irritable Bowel Syndrome are the two most common GI diagnoses in the Australian pilot population. Underlying pathology that is severe or progressive is unlikely. However, the possibility of cardiological cause of the symptoms should always be borne in mind, particularly where there is resistance to treatment. Where there is chest pain with uncertain aetiology, it is imperative to exclude a cardiac cause before moving to GI or other systems.

Around 50% of all patients diagnosed with GORD have no findings on endoscopy. This is often described as nervous or non-ulcer dyspepsia (NUD) but in reality this is endoscopy negative symptomatic gastro-oesophageal reflux that might be revealed by other techniques, such as oesophageal pH monitoring. NUD refers to symptoms that occur in a group of people without endoscopic or physiological evidence of an acid-peptic complaint. These people usually have a limited or zero response to acid suppressing medication.
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2. Medical Aspects
2.9 Gastroenterology

Treatment can commence based on symptoms and endoscopy conducted, when response to treatment is poor, “alarm” symptoms occur (eg bleeding, dysphagia) or long term treatment appears to be indicated. Medication is generally very successful, especially with the development of Acid/Proton Pump Inhibitors (PPIs). These drugs have a low side effect profile. Bleeding from reflux oesophagitis while on PPIs is very rare. In theory, intense gastric acid suppression by PPIs may increase susceptibility to gastrointestinal infection, as the internal environment of the stomach is less hostile to ingested organisms. Those who have been treated and are symptom free are generally suitable for certification. Where there are persisting symptoms, treatment should continue, with regular reviews. High-risk ‘alarm’ symptoms such as dysphagia indicate endoscopy. After short term treatment symptoms may return, sometimes with a rebound effect after stopping a PPI. Ongoing treatment may be indicated. However, ‘on demand’ treatment is becoming more popular. This should not present difficulties with aviation duties.

Selective Serotonin Reuptake Inhibitors (SSRIs) are fairly commonly prescribed along with PPIs for non-ulcer dyspepsia. This is not a risk in itself, but caution is required with the use of SSRIs. Refer to the Section 2.6 Psychiatry in this handbook. Cisapride and SSRIs have a risk of cardiac arrhythmia. Treatment with cisapride is mostly limited to treatment of gastroparesis and therefore cisapride is likely to be withdrawn from the Australian market.

Other medications that may be used include H₂ receptor antagonists. There is some sedation associated with these medications, and a ground trial period is advised. Metaclopramide may on occasions alter the level of consciousness and should not be used for ongoing treatment.

**Barrett’s Oesophagus**

- **Long Segment**: Second-yearly endoscopy will generally be required.
- **Short Segment**: Five-yearly endoscopy will generally be required but current approaches vary.

2.9.4 Peptic Ulcer Disease

Management of peptic ulcer disease (PUD) has changed comprehensively following the identification of helicobacter pylori as the most common cause of ulcers. The vast majority of peptic ulcer disease is now known to be due to helicobacter or NSAIDs. Smoking is a further independent risk factor. PUD may be ‘silent’ and not cause symptoms but the risk of a sudden acute bleed in an asymptomatic person is small. “Silent” ulcers are more common and more likely to cause morbidity in those taking NSAIDs including COX-2 inhibitors.
2. Medical Aspects

2.9 Gastroenterology

Duodenal PUD

**Symptomatic PUD with helicobacter pylori.** With the onset of symptoms, the DAME should impose a period of no flying or controlling. In this case, there is a requirement to undertake clearance of the infection prior to return to flying. A negative urea breath test is usually taken to be definitive proof of clearance when performed around two months after treatment. Where the DAME is satisfied that that symptoms have resolved and there will be compliance with the rest of the treatment, there may be a return to flying or controlling. Such return must be on the understanding that evidence of clearance of infection is required within three months of completing treatment. Definitive proof of clearance is usually currently obtained by a urea breath test around two months after treatment. A period of at least seven days off PPIs is necessary prior to the test. Should the infection still be present, the risk of recurrence of symptoms is high (around 80% in the first year). Failed eradication usually indicates the need for further treatment. Without eradication after the follow up test, further treatment is required. Where this second attempt at clearance is unsuccessful, the pilot or controller will usually be grounded until eradication is proven. Where there is symptomatic duodenal PUD only without complication, there is no requirement for a second endoscopy to prove ulcer healing. Once eradication has occurred, the lifetime risk of recurrence is only around 3 to 5%.

**Symptomatic PUD without helicobacter pylori.** The cause of the PUD needs to be identified and corrected. This is most commonly NSAIDs. The usual treatment for the ulcer in this case is a PPI for around six to eight weeks.

**Complicated duodenal PUD.** Where there are complications of PUD such as bleeding or perforation the pilot should be grounded during treatment. Endoscopic proof of ulcer healing will usually be required prior to clearance to return to flying or controlling. Approximately 80% of all ulcers are healed after one month. Therefore, the second endoscopy is best scheduled for around this time. Furthermore, when helicobacter infection has been detected and treated, proof of clearance will be required either by a urea breath test or endoscopic gastric biopsies for rapid urea testing (eg CLO/HUT tests) or histology.

**Chronic duodenal ulcer without eradication of Helicobacter pylori.** Consideration will be given to certification of pilots or controllers who have not eradicated Helicobacter pylori, either due to not undertaking eradication or failure of the eradication. Applicants must be on long-term maintenance therapy with a proton pump inhibitor and without symptoms.

**Gastric Ulcer**

Gastric ulcers should be treated in a similar way to complicated duodenal ulcers. A second endoscopy, usually at one month after beginning treatment, is required to demonstrate healing of the ulcer prior to consideration of return to flying. The underlying cause of the ulceration needs to be identified and corrected wherever possible.
2.9.5 Hepatitis

Acute

Acute hepatitis may be due to a number of causes, predominantly infectious but may also be toxic or immunological. The individual is usually too sick to function adequately and is not physically able to fly. The enterically mediated causes, mainly Hepatitis A and E, and other causes such as CMV and EBV generally result in a full recovery. Initial work up should include routine blood tests, LFTs, FBE, infectious hepatitis serology, and an upper abdominal ultrasound. Return to flying is based on evidence of clinical recovery. Some episodes of hepatitis are followed by a prolonged phase when the patient remains jaundiced but otherwise recovers. No further investigation is recommended until six months after presentation, unless the episode is fulminant. In this case, patients may progress from walking to moribund in 24 to 48 hours, but thankfully this extremely fulminant presentation is rare.

Chronic

The main causes of chronic hepatitis of aeromedical concern are Hepatitis B and Hepatitis C. These may be slowly progressive and may lead to cirrhosis and hepatic decompensation. There is unlikely to be an acute presentation, unless unexpected decompensation occurs secondary to portal hypertension causing haematemesis or ascites with infection.

Transmission of infection is not an issue in civilian aviation. The presence of Hepatitis D in particular should raise the prospect of intravenous drug use.

Treatment for Hepatitis C. Current treatment protocol for progressive Hepatitis C infection is combined Interferon and Ribavirin. Both of these medications have significant aeromedical issues, with interferon occasionally causing neuropsychiatric symptoms, which may occur intermittently and unpredictably throughout treatment. Most people also experience significant malaise. Ribavirin produces a significant anaemia in many patients. Thus, there should be no flying or controlling during the course of treatment. There may be consideration of return to duties once off medication and any anaemia has resolved.

Progressive hepatitis There is no one measure of the progression of chronic hepatitis and cirrhosis. Bilirubin, albumin and prothrombin time/INR are the best independent laboratory measures. These should be considered together with the presence of ascites and encephalopathy. Each case needs to be individually assessed, particularly for the presence of portal hypertension and hepatic encephalopathy, including minimal (stage 1) hepatic encephalopathy (MHE). While there is no overt deterioration in cognitive or affective functioning, there will not be a restriction on flying, but increased surveillance will be necessary.

Abnormal LFTs that have been noted for greater than 12 months indicates the potential for chronic liver disease and cirrhosis.
**Liver biopsy.** A liver biopsy provides very useful diagnostic and prognostic information but can cause serious complications such as intra-abdominal haemorrhage. The decision to recommend biopsy will usually be delayed for at least six months after presentation depending on the degree to which liver enzymes and function are abnormal. Many patients with abnormal liver enzymes, even over a long period, will not have an absolute indication for liver biopsy. The timing of liver biopsy, if necessary, can be based on clinical progression and the level of concern expressed by the patient regarding diagnosis and prognosis.

### 2.9.6 Abnormal Liver Function Tests

Liver function tests are frequently found to be abnormal, with small elevations in one or two liver enzyme parameters. Given that the normal range by definition comprises two standard deviations from the mean, some 5% of all truly normal results will be classified as being abnormal—that is, falsely abnormal results. Where there is a real abnormality, the most common causes are Gilbert’s Syndrome (slightly raised unconjugated bilirubin, most common manifestation), non-alcoholic fatty liver disease (NAFLD), and minor alcohol effects.

In the absence of other clinical clues, slightly abnormal LFTs are best repeated after around one month. If they remain elevated, then the following is recommended:

1. Assessment of alcohol intake.
2. Family history of liver disease.
3. Blood Tests: Hepatitis B & C; Iron studies including ferritin; Copper studies; α1 antitrypsin; hepatic autoantibodies.
4. Upper abdominal ultrasound.

Definitive diagnosis of a fatty liver can only be achieved by liver biopsy, but it is usually diagnosed based on clinical picture only. Alcoholic disease and diabetes mellitus should be included in the differential diagnosis. Ultrasound is moderately reliable for fatty liver, with increased echogenicity/altered hepatic texture most likely to be due to fat. However, fibrosis or cirrhosis could also be present and difficult to detect.

There should be regular reviews of aircrew with continuing abnormal LFTs. Where transaminase is <100, repeat testing should be every six to 12 months. If the transaminase is above 100, testing should be every three to six months.
2.9.7 Alcoholic Liver Disease

This section will not discuss alcohol related illness. Rather, there will be a discussion of the effects of alcohol on the GI system.

There are no definitive tests that can demonstrate clearly that alcohol is the cause of liver disease. In the end it comes down to honest reporting. Blood tests can help; MCV, γGT and AST>ALT are suggestive. Liver biopsy is not definitive as many other causes can produce similar findings. Carbohydrate deficient transferrin is becoming used, but it remains largely a research tool. It can be useful as a confirmation, and to monitor progress within that individual.

Relapsing hepatic decompensation, gastritis, neurological signs, including cerebellar signs are all useful as part of a broader picture in advanced cases of alcoholic liver disease when cognitive and physical incapacity are present. DUI convictions may also be indicative.

Screening tests have not been found to be particularly valuable. The AUDIT is probably the most widely used. The tests are aimed at the severe end of the alcoholic spectrum. In practice, concern should be raised where the drinking exceeds the NH&MRC recommended limits of four standards drinks per day for men and two standard drinks per day for women.

Approximately 1:5 people who drink excessively will have liver abnormalities. It is the most reversible form of liver disease in the early stages. Stopping drinking will usually reverse abnormalities within around six months. The alcoholism is more important than the alcoholic liver disease, and the focus should be put on the alcoholism. Until there is a secondary effect from liver damage, there should be no impact on flying from the liver disease. The impact on flying will be from the alcoholism.

2.9.8 Gallstones And Gall Bladder Diseases

Asymptomatic gallstones (chance finding). It appears that the risk of cholecystitis in the presence of asymptomatic gallstones, where there has never been symptoms, is low, and almost certainly is below 1% per annum, although there is little data to work from. Gallstones ranging from a single large stone to multiple small stones may be detected by ultrasound. There is a slightly increased risk of biliary colic, pancreatitis and other hepatobiliary symptoms with small gallstones but the outcome of expectant versus prophylactic cholecystectomy is no different. There will generally be no change to flying status unless gallstones become symptomatic. In those who are asymptomatic there is no requirement to remove the gall bladder for fitness to fly.

Acute cholecystitis. Generally the pilot will be too sick to fly.
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Following single episode of cholecystitis. Often after a single episode, patients are treated expectantly and wait to see if another episode occurs. However, the risk of a further episode is around 5% per annum. Therefore, it would be expected that there is no return to flying until the gall bladder is removed. There may be the option of multi-crew certification for Class 1 or 2, or no solo controlling for Class 3 pending definitive resolution.

Stones in bile duct. The presence of stones in the bile duct is not compatible with flying or controlling. There is a significant risk of ascending cholangitis or pancreatitis, and the stones must thus be removed prior to returning to any duties.

2.9.9 Haemochromatosis

Haemochromatosis is a genetic disease that is often found incidentally, mainly through liver function testing or iron studies. The presence of the relevant genes in the Australian population is around 1:200. Around 50% of these will develop significant iron loading but not all genetically affected individuals develop liver or other organ injury (ie, phenotypic variation in disease expression). Organ injury depends on the severity of iron loading and co-factors such as significant alcohol consumption or other co-existent causes of liver injury. Should iron loading be prevented (usually by early detection and venesection treatment) then permanent liver injury (fibrosis/cirrhosis) usually does not occur. The best measure of iron stores in this context is serum ferritin.

Screening is possible, but to date has not been recommended in the Australian population. This may be by transferrin saturation, or by HFE genetic testing. There is no requirement to screen for haemochromatosis in the aviation context unless there is a family history of the disease.

Late diagnosis can be a problem, with progression to cirrhosis, pancreatic injury (diabetes mellitus), heart (arrhythmias, heart failure) and pituitary involvement. Males usually present in the 5th decade, females in the 6th decade due to their generally lower rate of iron load. If, at age 40 years the ferritin level is less than 1000 ugm/l and LFTs are normal, the risk of permanent liver damage is negligible. Cardiac assessment should include the presence of conduction defects and cardiomyopathy.

Treatment is via regular phlebotomies/venesection. Pilots and controllers should not exercise the privileges of their certificates for 24 hours after each venesection due to possible cardiovascular instability.
2.9.10 Pancreatitis

Pancreatitis is sometimes diagnosed in the setting of a small increase in serum lipase. However, for the diagnosis to be made there should be a significant increase in lipase together with acute abdominal pain.

The main risk factors are

- **Gall stones.** If gallstones are found, where there are no other risk factors, the gall bladder should be removed.
- **Alcohol.** This usually produces a relapsing picture.
- Hypercalcaemia.
- Hyperlipidaemia.

Where there is no obvious cause, there may be abnormalities in anatomy. Assessment is usually by MRCP first, followed by ERCP.

Risk of recurrent attacks is highly individual. Idiopathic pancreatitis may be expected to have one to two attacks per year.

**Single episode.** Following a single episode, where there are no ongoing symptoms and any predisposing factors have been addressed, the individual will usually be able to return to flying.

**Recurring pancreatitis.** While symptomatic the individual is very unwell, usually requiring narcotic analgesia. Recurrent pancreatitis is generally not compatible with continued flying or controlling.

**Chronic pancreatitis.** Generally the individual is too sick or has too much ongoing abdominal pain to contemplate flying. A CT scan can be performed to look for the presence of a pseudocyst or abscess. It is unlikely that anyone suffering from chronic pancreatitis will be fit for flying or controlling duties.

There is an association with the development of diabetes; a fasting blood sugar should be obtained as part of the workup.
2.9.11 Coeliac Disease

Coeliac disease can produce severe symptoms of bloating, diarrhoea, abdominal pain and anaemia, but mostly symptoms are mild and presentation is now usually in mid-life. Treatment with a gluten-free diet is usually effective, and should not be an aviation safety issue. People non-compliant with dietary modifications will continue to be symptomatic and some patients will exhibit refractory disease; these cases should be considered on their merits.

Coeliac disease should be thought of as a potential marker for other immunologically mediated diseases, such as type 1 diabetes mellitus and thyroid disease.

2.9.12 Irritable Bowel Syndrome

Irritable bowel syndrome is a very common diagnosis in the Australian pilot population. Some 20% of adult females and 10% of adult males have some symptoms consistent with this diagnosis. Most common symptoms are of abdominal pain, bloating, diarrhoea and constipation. It is unusual to get acute, severe symptoms.

There is a high co-morbidity with obsessive and depressive illness and SSRIs are often used.

Most people can be managed without drugs, using diet.

Diarrhoeal symptoms may be treated with loperamide. This drug does not usually have any central nervous system side effects. Diphenoxylate should not be the first drug of choice for aircrew or controllers, due to its potential neuropsychological effects. If it is necessary, this should be discussed with Aviation Medicine Section doctors.

Colicky abdominal pain and more general abdominal discomfort can be treated with anticholinergics such as donnatabs or mebeverine. Bloating will tend to persist despite treatment. Caution is required regarding anticholinergic side effects, particularly to vision.

Constipation can be treated with high fibre and simple laxatives, with osmotic laxatives such as magnesium sulphate or lactulose preferred in the longer term.

For refractory symptoms, tricyclic antidepressants are the most effective. Tricyclic antidepressants have significant potential aeromedically adverse effects. Refer to Section 2.6 Psychiatry for further guidance.

Most applicants will be fit to hold a certificate. Surveillance may be required annually in the more severe cases.
2.9.13 Inflammatory Bowel Disease

It is often assumed that Ulcerative Colitis and Crohn’s disease are versions of the same disease or are even interchangeable. However, they do have differing natural histories, with Crohn’s disease tending to be worse, with relapse being the rule.

It should be assumed from the outset that Inflammatory Bowel Disease (IBD) will impinge on certification. However, most sufferers are able to obtain certification with regular surveillance.

High-dose systemic steroids should not be used while flying due to the risk of neuropsychological side effects.

If the disease is unstable the person should be grounded, due to diarrhoea, pain and poor nutrition. Stabilisation is usually over several months during treatment with aminosalicylate drugs (e.g., sulphasalazine, mesalazine, olsalazine) and either systemic or rectal corticosteroid treatment. Immunomodulatory medication (such as azathioprine or 6-mercaptopurine) is used to prevent disease relapse in more severe cases. There is a higher risk of skin cancer on azathioprine. Methotrexate can damage the liver.

CASR 67.265 Flare-ups tend to occur in a subacute manner, with warning often over several days. Acute incapacitation is unlikely, unless there is a clear pattern of such already established. Fitness to fly during flare-ups should be handled as a transient event with clearance to return to flight duties according to CASR 67.265.

Ulcerative Colitis

Ulcerative Colitis may be severe, but is often a relatively mild disease. This is especially so of treated ulcerative colitis of the rectum and sigmoid. The disease may ‘burn out’ in the 50s. With proctitis alone, risk of cancer is no different to the general population.

Crohn’s Disease

Almost all Crohn’s sufferers receive surgery at some stage. Systemic symptoms are more common with febrile disease and acute abdomen amongst the more common manifestations.

For mild disease, Full Blood Examination, C-reactive Protein, Liver function tests and rectosigmoid examination should be carried out annually. LFT should be more often if taking methotrexate.

When there has been pancolitis, regular annual or biennial colonoscopy will improve early detection of colorectal neoplasia beginning eight to ten years after initial diagnosis of colitis.
2.9.14 Chronic Diarrhoea

There are many potential causes of chronic diarrhoea. Most commonly there is irritable bowel syndrome. However, it is important to rule out an infective cause. Medications may also be a cause, such as weight loss treatments including xenical.

In general, diagnosis should be by exclusion of treatable GI disorders, and then treated as for IBS.

2.9.15 Diverticulitis

Diverticulosis of itself is not an issue for aviation safety. A single episode of diverticulitis is generally not of significant concern. Where there is chronic symptoms or recurrence, it is important to evaluate for risk of further symptoms. Partial colonic resection may be required. Each case will be considered on its merits.

2.9.16 Colonic Polypectomy

Following polypectomy by colonoscopy, there is an approximate risk of 1:300 to 1:500 that a significant colonic bleed from the polypectomy site will occur in the first two weeks. The risk is higher if anti-platelet drugs or anti-coagulants are taken after colonoscopy. During this time, therefore, it is best not to fly, due to the risk to safety and lack of access to care. However, it may be reasonable to consider flying operations other than single pilot operations or no solitary controlling.

2.9.17 Bowel Obstruction

Bowel obstruction will result in severe pain and vomiting. A history of bowel obstruction indicates a high risk of recurrence. A single band or hernia can be repaired and certification is usual after recovery. However, recurrent obstruction is of grave concern for certification. Generally, the more episodes of obstruction, the greater the risk of subsequent episodes. Certification will be on a case-by-case basis, with a surgical opinion as to the cause and likelihood of recurrence.
2.9.18 Stomas

In this section the underlying illness or event leading to creation of an “-ostomy” is not addressed. Stoma bags are generally vented and filtered to avoid any risk of trapping of gas or odours becoming an issue.

**Colostomy**

Generally, patients with a colostomy manage well. Most are due to surgery for colon cancer, and the oncology issues are more important. See section 2.14 Malignancy of this handbook. A total colectomy for functional problems often results in small bowel functional problems.

**Ileostomy**

The major issue with ileostomy is dehydration. Electrolyte disorders are fairly common, with hyponatraemia and bicarbonate loss. Fluid that is usually reabsorbed will be lost through the stoma, and an additional litre of fluid may be required.

The great majority of applicants with a stoma will not be restricted on the basis of the stoma.

2.9.19 Haemorrhoids

Haemorrhoids will occur with a relatively high frequency in the pilot population, due to poor low fibre diet, inadequate seating and dehydration. It is rarely a cause of acute incapacitation.

Rectal bleeding should be investigated to exclude other causes, especially carcinoma, even in the presence of haemorrhoids. Only with the exclusion of other causes should the haemorrhoids be regarded as the cause.

An acute clot in an external haemorrhoid often causes marked discomfort, but should not be sufficient to cause incapacitation.

The presence of haemorrhoids should not in general hold up certification.

2.9.20 Anal Fissure

As for haemorrhoids, the presence of bleeding should result in investigation to exclude other more serious causes. The fissure may be distracting but not to the extent of incapacitation.
2.9.21 Abdominal Hernias

Abdominal hernias are of concern due to the risk of acute intestinal obstruction. Where the hernia is amenable to repair and there is a risk of obstruction, it should be treated. If no treatment is planned, a justification based on likelihood of becoming symptomatic should accompany any application. While waiting for repair, the need to restrict the applicant will depend on clinical circumstances. Where there is a bowel loop in a hernia, restriction is likely.

Hiatus hernias only infrequently require repair. A rolling hiatus hernia is at greater risk of obstruction. Generally symptoms can be managed through the use of proton pump inhibitors or H$_2$ antagonists.

2.9.22 GI Bleeding of Unknown Cause

Where there is an iron deficiency anaemia that has been investigated, and endoscopy and colonoscopy are reported as normal, the source of bleeding is likely to be from the small bowel. Often iron deficiency occurs in those who have had long-term aspirin or NSAID treatment. At present, in the absence of ‘red flags’ (eg, systemic symptoms such as unexplained weight loss, fevers, night sweats, persistent significant change in bowel habit, abdominal pain or symptoms of overt GI bleeding such as malaena) to suggest a serious cause, the patient will not be further investigated, and iron supplements used. If supplements are successful, then a cause will probably never be found.

Where iron supplements are used and anaemia progresses, further investigation is required; this may be enteroscopy using a similar procedure to endoscopy, ‘capsule endoscopy’ and/or CT scan. A thorough work up is mandatory to exclude significant disease.

It should not be necessary to ground pilots except those whose anaemia progresses and haemoglobin drops below 10.

If the Hb recovers, then surveillance should be of regular Hb levels, at least every two months for 6-monthly and subsequent testing depending on progress. Restoration of body iron stores (as documented by a progressively normalising serum ferritin taken during a period when iron supplements have been stopped for at least one week) by treatment with oral iron supplements usually takes three to six months minimum, usually with the Hb having returned to normal at an earlier time.

A presentation of malaena is a very different proposition. A cause will need to be identified as there is a high risk of recurrence and of severe causes. The individual should not fly until the cause has been identified and risk of recurrence quantified.
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2.10.1 Introduction

Applicants with haematological conditions are considered individually depending on the nature of the condition, its cause (if known) and natural history. The overriding concern is that the blood must carry sufficient oxygen to satisfy metabolic requirements during all phases if flight.

2.10.2 Reticulo-endothelial System Standard – CASR Part 067

CASR 67 The Reticulo-endothelial System standards are found in the following paragraphs of CASR Part 67:

- CASR 67.150 For medical standard 1 CASR 67.150(7)
  Table 67.150
  1.17 – 1.18

- CASR 67.155 For medical standard 2 CASR 67.155(7)
  Table 67.155
  2.16 – 2.17

- CASR 67.160 For medical standard 3 CASR 67.160(7)
  Table 67.160
  3.16

2.10.3 Anaemia

Applicants whose haemoglobin is less than 100 g/l should be investigated as clinically indicated. Final assessment depends on the results of haematological investigations and response to treatment. Full reports are required.

2.10.4 Polycythaemia

Applicants with higher than normal haemoglobin must be appropriately investigated. In secondary polycythaemia due to lung disease, the lung disease is more important. Applicants with polycythaemia vera, untreated or uncontrolled, will be assessed as failing to meet the standard, but will be reconsidered depending on their response to treatment, and on specialists’ reports.
2.10.5 **Acute Leukaemia**

Acute leukaemia of any type is disqualifying. Applicants assessed as in remission may be permitted to exercise the privileges of the licence held, depending on specialists’ reports. Full details are required.

2.10.6 **Chronic Leukaemia**

Chronic leukaemias are assessed individually. A specialist’s report is required in every case, including a statement on prognosis for the next year (re-certification is year by year, if at all). Some chronic leukaemias, e.g. CGL, CLL and other myeloproliferative diseases, are usually associated with an enlarged spleen. There is a consequent risk of splenic infarction and rupture (spontaneous or traumatic) in these applicants.

2.10.7 **Lymphomas**

Applicants with lymphoma are assessed individually. A lymphoma in remission, especially Hodgkin’s Disease, is usually consistent with a pass assessment for applicants concerned. Annual specialist reports are required in all cases.

2.10.8 **Haemoglobinopathy**

Applicants with abnormal haemoglobins (HbS) are assessed individually. Full reports to Aviation Medicine Section are required.

2.10.9 **Haemophilia**

Applicants may be certified at the Class 2 level if the condition is stable. Full reports from the treating physician are required.
2.10.10 Oncology

Assessment of applicants with any diagnosis of malignancy is based upon the following considerations:

- Nature of tumour
- Stage of development/invasion
- Response to therapy
- Likelihood of recurrence in a form likely to be incapacitating, e.g. cerebral metastasis.

In general, applicants who are no longer receiving chemotherapy or radiotherapy, in whom the risk of incapacitation is considered to be low during the period of currency of the Medical Certificate, are given a pass assessment subject to continued medical surveillance.

Also see Section 2.14 Malignancy.

2.10.11 HIV Disease

Applicants who are HIV positive but without clinical disease may be certified at the Class 2 level and receive restricted certification (as or with co-pilot) at the Class 1 level.

Applicants should obtain reports (including CD4 helper cell count) from their treating physicians prior to seeking renewal.

When an applicant develops clinical illness associated with HIV disease, further certification is determined on a case-by-case basis. Full clinical details are required.

2.10.12 Blood Donation

In healthy individuals, the fluid depletion that accompanies donation of one unit of blood is replaced within several hours. Any effects from the loss of haemoglobin should not be significant for normal flying operations.

Active pilots should be discouraged from flying until 24 hours have elapsed following blood donation.
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2.11.1 Applicable Regulations

With regard to the **Skeletal System** the *CASR Part 67* states as follows:

**CASR Part 67, Table 67.150 criteria for medical standard 1 states:**

1.25 Is not suffering from safety-relevant active disease of the bones, joints, muscles or tendons

1.26 Is not suffering from safety-relevant functional sequelae of medically significant conditions of the bones, joints, muscles or tendons

**CASR Part 67, Table 67.155 criteria for medical standard 2 states:**

2.24 Is not suffering from safety-relevant active disease of the bones, joints, muscles or tendons

2.25 Is not suffering from safety-relevant functional sequelae of medically significant conditions of the bones, joints, muscles or tendons

**CASR Part 67, Table 67.160 criteria for medical standard 3 states:**

3.23 Is not suffering from safety-relevant active disease of the bones, joints, muscles or tendons

3.24 Is not suffering from safety-relevant functional sequelae of medically significant conditions of the bones, joints, muscles or tendons

2.11.2 Pain Management

Pain is a complex issue. Severity of reported pain is poorly correlated with the severity of the underlying condition. It is thus very important to identify the underlying condition and prescribe pain relief accordingly. The following discussion should be considered in conjunction with Chapter 13 of this handbook, dealing with certification issues and medication. Each drug group has an annotation, which places it in the category (A-E) as described Chapter 13.

**Non-steroidal Anti-inflammatory Drugs (NSAIDs) (B)**

In general, these medications (NSAIDs) are suitable for aviation duties, but with surveillance of possible adverse effects, particularly of gastric origin. The underlying condition for which they are prescribed needs to be considered in each case.
Cyclo-oxygenase type 2 (COX-2) inhibitors have been found to have an association with coronary disease and strokes in those already predisposed, through an effect on platelet function. It is generally advisable to cease COX-2 inhibitors unless the applicant has a history of peptic ulcer disease. Celebrex continues to be available and Mobic is now usurping the past popularity of Vioxx.

The older non-steroidal anti-inflammatory drugs, such as Ibuprofen, Feldene and voltaren continue to have a place.

Aspirin is effective as an anti-inflammatory agent, but has a significant risk of GI bleeding.

**Paracetamol (A)**

A maximum of four grams a day applies in the case of an adult, due to liver toxicity. It is not an anti-inflammatory agent, functioning in the main, directly on the brain to modify pain response in orthopaedic and rheumatological applications. Where the pain is purely mechanical, rather than inflammatory, Panadol may be the better option.

**Disease Modifying Anti-Arthritic Drugs (DMARDs)**

DMARDs have an important role in reducing symptoms from the condition for which they are prescribed. Where the pilot is being managed closely to identify any adverse effect early, and where there has been an adequate trial period—usually 4 weeks after commencing the medication —prior to return to flying or controlling, continued certification is usual. The extent of the functional effect from the underlying condition will be of significance in determining fitness for continued certification.

**Salazopyrin (C)**. There are often side effects such as indigestion and hepatotoxic reactions, which largely occur in the first three months. Therefore, the individual should be closely monitored during this initial period of medication.

**Gold (C)**. This is out of favour at present. It is toxic to bone marrow and can cause nephrotic syndrome.

**Methotrexate (B)**. Toxic effects are revealed early. Full blood count and liver function testing is suggested every six to eight weeks.

**D-Penicillamine (C)**. There is a range of side effects such as scleroderma, nephrotic syndrome, myasthenia gravis and marrow toxicity. If an individual is on this treatment without side effects for more than six months, it is likely that they will remain without side effects.

**Luflunamide (C)**. In the early period there may be diarrhoea and skin rash. FBE, ESR and LFTs are needed regularly.
Cyclosporin, cyclophosphamide (C). Provides serious immune suppression, but with a high risk of side effects. Generally these are only used when the underlying disease is severe and would normally preclude certification anyway.

Biologic Agents, such as ana kina and anti-tumour necrosis factor preparations (B). Side effects do not appear to be severe. The high cost at present tends to limit their use to severe disease.

Narcotics (C)

It should be considered barring treatment using all forms of narcotics for individuals involved in aviation-related duties. In exceptional circumstances, consideration may be given to individuals requiring narcotic analgesia where:

- The condition itself poses no safety risk
- Narcotics have been used for an extended period and it is clear that there is no adverse effect on attention or cognition
- Neuropsychological testing demonstrates that there is no demonstrable decrement in performance
- ATC simulator testing and pilot in-flight testing indicates satisfactory performance
- There is no requirement to use the medication within 12 hours of commencing aviation activities
- There is no evidence of addiction to the analgesic.

Tramadol is gaining considerable popularity. While not an opioid, it does have narcotic effects and may be addictive. It has inconsistent effects and side effects, with neuropsychological side effects and causing serotonin syndrome. Panadeine Forte contains 30mg codeine and is a significant opioid dosage.

Those applicants taking narcotics are, in general, ones who self-select; that is, those experiencing significant side effects from the medication, or with significant problems from the underlying condition. They should not plan to fly. They may feel suitable for duty, but there may well be subtle impairments and self-delusion (ie overconfidence) that the pilot or controller may not identify.

Amitriptyline (C)

This is often prescribed in low doses of 25 to 50mg at night to augment sleep. It is a soporific and has a long half-life. Some people are highly sensitive and there are a number of cross-reactions. Many people will be ‘slow to take off’ after taking amitriptyline the night before.
Corticosteroids (B)

Corticosteroids are a mainstay of treatment in many rheumatological conditions. They can be administered dermally, orally, by eye drops, intra-articularly, injection into the affected soft tissue and intravenously. Local application, even by intra-articular injection, is generally safe. Systemic symptoms are rare. However, occasional sleeplessness and hypomania is observed. There should be no flying or controlling within 24 hours following a corticosteroid injection.

Oral corticosteroids have a large and diverse range of adverse effects. These include mood change, thinning skin, diabetes mellitus, immune suppression and osteoporosis. These are almost invariably time and dose related. A general cut-off for onset of side effects is greater than 10mg per day for more than six months. If more than 10mg per day is being prescribed, bone density assessment should be obtained every two years.

If taking oral medications such as dexamethasone or betamethasone, there should be a more intensive monitoring program, as there is a high incidence of side effects. It is important to understand why the individual has been placed on these medications rather than prednisone or prednisolone.

2.11.3 Functional Assessment

Range of movement

Neck range of movement (ROM) is the most important assessment for a DAME. Unless the restriction is severe, 'trick' movements are usually available to compensate for limited neck movement. Provided the pilot can evacuate himself and his passengers safely and rapidly, there is generally no impediment strictly due to ROM limitation.

In reporting to CASA, the ROM should be given in degrees in the three planes of movement, flexion/extension, lateral flexion and rotation.

Operational Assessment

A specific flight test to evaluate the functional impact of a restriction of movement due to an orthopaedic or rheumatological condition may be required. Each assessment will depend on the pilot, the aircraft type and the normal aviation activity undertaken.

A DAME may recommend directly to the certificate holder/applicant that such an assessment take place, or a recommendation can be forwarded to CASA for aviation medicine section to consider such an assessment. Where the DAME conducts the assessment from a referral, permission should be sought from the pilot for details of the impairment to be included in the referral letter. The letter to the pilot undertaking the assessment should be written in plain English, requesting advice of the functional effects on the certificate holder's ability to carry out aviation duties. These may include cross control in strong crosswinds, or single engine flight in a twin-engine aircraft, the full and free movement of all flight controls, and ability to see unimpeded in all significant areas.
It is often beneficial to talk to the assessing pilot prior to the assessment to clarify the requirements. A Chief Flying Instructor of a registered flying school can perform the assessment, provided that the individual is prepared to conduct such an assessment. Tests directed to be undertaken by CASA aviation medicine section will usually be performed by an approved testing officer (ATO).

Should the pilot refuse permission for release of relevant medical information, there may be a limited capacity to properly assess the individual, and further testing may be required. The pilot should be made aware of the consequences of the refusal and an attempt made to reach agreement on what information can be imparted.

After commencing narcotic or opioid medication, the ATC or pilot should have a test equivalent to their regular test/training regime. For instance, a private pilot will need to bring forward a biannual flight test, and provide a report of that test as part of the assessment for certification.

### 2.11.4 Specific Conditions

#### Arthritis

**Rheumatoid arthritis (RA)**

RA often has systemic effects. It tends to be erosive, with the destruction of tissue. Joint deformity in the hand and grip weakness is likely to be the most significant issue for aviation. A normochromic normocytic anaemia of chronic disease is common and needs to be monitored. Sufferers can have a fairly normal life, particularly if the activity of the disease is controlled early. As a generalisation, people with Rheumatoid arthritis tend to function at a higher level than the extent and apparent severity of the disease would indicate. Fitness for aviation duties will be assessed on a case-by-case basis.

There may be ophthalmic effects, such as from the use of Plaquinil or steroids. If there are no signs or symptoms of ophthalmic involvement, there is no requirement for routine ophthalmic assessment beyond those stipulated based on age and Class of certificate.

RA should best be monitored for effective management by a rheumatologist rather than GP. An annual report from the specialist will usually be required as part of ongoing certification. Serial plain X-rays, FBE and ESR can follow disease progression and activity. LFTs are usually required to check for side effects of medication.
Osteoarthritis (OA)

There may be primary osteoarthritis, without previous trauma to the joint, or secondary osteoarthritis where there is a predisposing injury. There is usually no inflammation, but Heberden's and Bouchards nodes in the hand do have an inflammatory component. The effects can be divided into functional limitations as a result of reduced range of movement and pain. Simple analgesics and physiotherapy are the mainstay of treatment. Unless there is a significant functional impact, sufferers from osteoarthritis will generally have unrestricted certification. Serial plain X-rays and testing for side effects of medication will be required, again on a case-by-case basis.

Seronegative polyarthritis

This may be rheumatoid arthritis where there is no rheumatoid factor detectable, or those associated with HLA B27. 8% of the Caucasian population are positive for HLA B27, and some 1% to 8% of these develop a seronegative polyarthritis. The most prominent type is Ankylosing Spondylitis (AS), but there is also Reiters syndrome, post-salmonella and post-yersinia infection and psoriatic arthritis.

Ankylosing spondylitis presents as a progressive stiffening of the lower back, with pronounced symptoms after extended inactivity, such as sleep. Physiotherapy modalities, exercise and NSAIDs are the most widely used treatment. It affects males to females in the ratio of 8:1. Sitting for a long time, such as in ultra-long haul sectors, may induce stiffness, but it is generally possible to regularly stand and perform stretches.

Gout

Gout tends to be poorly treated overall. It can be of sudden onset and disabling. There is increased risk from sitting, when dehydrated and post-surgical. Thus, the aviation environment does have significant risk for a gout attack.

Most attacks are in people who are poorly managed and who are not compliant with medication and diet.

More than three attacks a year, particularly where the serum urate is greater than 0.45, and tophaceous gout, where there is the presence of destructive articular disease demonstrating long-standing poor control, carries unacceptable risk of a further attack. Given that the onset can be sudden, within the length of a flight, and can be incapacitating, careful consideration will be given to making the pilot or controller unfit until adequate control is demonstrated. Control would be shown through uric acid levels, compliance with medication such as allopurinol, and avoidance of alcohol and other dietary modifications.
Psoriatic arthritis

This usually presents as mono or oligo arthritis, and affects around 8% of patients with psoriasis. It can be progressive and present similarly to rheumatoid arthritis. It should be considered on a case-by-case basis.

Lupus and Connective Tissue Disorders

There appears to be a reduction in numbers and severity of these conditions in the last 50 years. Systemic Lupus Erythematosus (SLE) is diagnosed mainly through a positive anti-nuclear factor and elevated anti DNA, but requires at least four criteria. DMARDs hydroxychloroquine and steroids are the mainstay of treatment. Multiple organs may be involved, including reticulo-endothelial with anaemia, and kidneys with proteinuria. When stable, SLE should be reviewed by a rheumatologist three-monthly, with certification usually being limited to 12 months. Annual reports will need to address any systemic involvement.

Polymyalgia Rheumatica

This generally presents as an acute illness, with equal sex ratio, and rarely under age 60. There is central joint involvement and night stiffness. It is usually well controlled with corticosteroids, of around 15mg of prednisolone per day. Once on treatment, there is a return to normal function within one month, and a gradual reduction in medication with cessation of medication over a period of around two years.

The condition can be relapsing, with the most serious effects being cranial arteritis, which may result in severe headaches and blindness. Visual loss can be sudden. This is rare once on steroids, and if ESR/CRP results are normal, risk is acceptably small.

All certificate holders should be monitored through three-monthly ophthalmology and rheumatology reviews, and three-monthly ESR tests. Certification is usual, provided the condition is controlled, with six- or 12-monthly validity. The relevant reports will be required for re-certification.

Osteoporosis

This condition is associated with a number of risk factors. These are:

- Chronic ill health
- Cigarette smoking
- Family history
- Systemic steroid use
- Post menopausal women
- Women with non-functioning ovaries.
2.11 Orthopaedics and Rheumatology

It is less common in males, but still substantial, especially where testosterone levels drop.

In those with established osteoporosis, bone density estimation should be obtained three-yearly. In the presence of a fracture, bisphosphonates such as fosamax and actonel can assist. Weight-bearing exercise is important for prevention and treatment.

There is little immediate relevance in civilian flying if a fracture does not exist or has not occurred. Any fracture should be treated on its own merits.

Chronic Fatigue Syndrome (CFS) and Fibromyalgia

This is a diagnosis of exclusion as there is no specific diagnostic test. No pathology has ever been demonstrated to be the cause. It is widely assumed that a psychological disturbance underlies the presentation in most if not all sufferers. Symptoms are diverse, including sleep disturbance, trigger points, and depression. While fatigue is prominent, there is no change in oxygen consumption with exercise; the only detectible change is in terms of perceived effort. Treatment is prolonged and expectant, with anti-depressants widely prescribed. Rest should not be prescribed.

Most CFS patients are not motivated to continue flying while symptomatic. A psychiatric diagnosis should be excluded. While symptomatic, chronic fatigue syndrome is generally incompatible with aviation duties.

Scleroderma

In its severest form—progressive systemic sclerosis—this condition can have implications on flying. It is generally found in a population in their third and fourth decades and is more common in females. It can progress rapidly, and involve the hand, resulting in contractures, with marked functional limitation. It can be made worse in cold environments such as often encountered in cockpits with poor environmental control. The CREST syndrome (calcinosis, Raynaud's, oesophageal involvement, sclerodactyly and telangiectasia) often involves pulmonary function, with 15% having pulmonary hypertension. It is important to maintain close supervision through rheumatology follow-up at least annually. Refined pulmonary function testing, CT of lungs and echocardiography will be needed where there is any suspicion of pulmonary involvement.

Vasculitis

Polyarteritis nodosum is the most common form. Vasculature anywhere in the body can be involved, and commonly includes the kidneys. Prognosis is always guarded, and certification will be based on history of extent and severity of disease and effectiveness of medication.
Spinal Injury

Whiplash

This condition is something of an enigma, as it tends to be described in only very limited contexts, particularly rear-end motor vehicle accidents. Pathology cannot be demonstrated experimentally. A lateral X-ray should be obtained acutely to exclude instability. A bone scan may be valuable at three weeks to identify bone or connective tissue damage.

Most cases settle very quickly. The principle method of rehabilitation is one of goal setting with steady improvement over several weeks.

Certification should be based on mobility and pain impact. Most cases can be managed by the DAME determining when the certificate holder is fit to return to aviation duties.

Stable fracture of the spine

There should be an expectation of a return to activities within 12 weeks, with an absolute maximum of 26 weeks. The ability to withstand prolonged sitting will be the main decider.

Non-stable fracture of the spine

Where there is operative treatment with insertion of a plate, recovery will be in 12 to 26 weeks. With two fracture levels, there is a longer recovery time, but practically all return to full activity.

Posterior ligament rupture

This is potentially unstable, where two of the three columns in the spine are damaged. Return is based on the treating orthopod advice, but usually should be three months before returning to flying activities.

Spinal fracture with cord lesion

Nearly all such patients will have fixation with pedicle screws. Recovery is usually based on force of injury. It will be necessary to wait for the assessed maximal recovery, and see how the individual is able to function. Urinary tract obstruction is often the main problem. Modifications to the cockpit, such as a Blackwood Pole for pedal manipulation can potentially still permit some flying.

Paraplegia

Once stable and functioning satisfactorily utilising a range of mechanical aids, should the individual wish to undertake aviation activities, functional testing will be required. The main issues will be mobility around the cabin, particularly full and free manipulation of flight controls and emergency egress.
Spinal Stenosis

The diameter of the cord is 11 mm minimum. Where the diameter is less than this, symptoms may occur. Pathology is often found in the lumbar region. There may, however, be smaller sizes found in scans, which have no symptoms. Where the neck is involved, there will usually be a myelopathy. The condition is usually slowly progressive, with nerve root pressure and neurologic claudication. Sitting does not affect the condition significantly, and the result is that pilots are affected very little.

Syringomyelia

This condition is more common in males, and is mostly an incidental finding. Symptoms, when present, tend to be vague, with difficulty in fine motor control in the hands. There is an asymmetric abdominal reflex. An MRI will show Arnold-Chiari malformation or a syrinx. Where there are symptoms, there is usually drainage of the syrinx, and reassessment. Most will be able to continue flying unrestricted.

Scheuermann's Disease

This abnormality of bony development is predominantly found in the lower thoracic vertebrae in males. Longitudinal studies have indicated that it has minimal impact in the long-term, and should not affect flying. Occasionally there is significant scoliosis, which requires a brace for about six months.

Spondylosis

This is an injury to the pars interarticularis. It is not congenital, but is found in 5% of boys by the age of five years. This varies by family history and racial background, and is more common in males. It can occur as a result of overuse in gymnasts and fast bowlers in particular. Rest and attention to technique is the core of treatment.

Spondylolisthesis involves a bilateral lesion with slippage of one vertebral body on the one below. When the slip is at risk of compromising the cord, or there is disability, surgery may be required. There may be some pain or discomfort but generally this does not preclude work.

There is little to suggest that there are any issues for aviation.

Scoliosis

When scoliosis is less than 30° it is of little consequence. Once at 50-60° at the end of its growth, it is often progressive and requires surgical intervention. There is little impact on function or on flying.
**Backache**

Backache, usually lumbar, is very common. Early normalisation of activities is the cornerstone of treatment. Avoidance of twisting is helpful. The few that are not cured within six to 12 weeks should be assessed in a rehabilitation program to seek an underlying problem.

In rotary wing aircraft, the normal posture of forward bending and lateral flexion tends to induce backache. No degeneration is reported from repeated minor stressors. It is usual not to complain of such pain until after retirement from aviation.

**Sciatica**

This is leg pain as a result of pressure on nerve roots. Back pain may also be present, but the leg pain is usually much more prominent. Treatment is expectant, with 50% improvement in 12 weeks, 80% in two years and 95% in five years, while surgery (laminectomy) has a 95% success rate. Recurrence is around 1-2% per annum.

It is possible to be fully active with sciatica without the risk of further damage. Thus, return to flying should be based on symptoms and need for medication.

**Loss of Limb**

Amputation should be considered on the basis of function. Occasionally, phantom pain or a neuroma in the stump can cause discomfort, but this is rare and can be adequately managed. Should the loss of limb be due to a tumour, the risk of recurrence must be taken into consideration.

Above-knee amputation as opposed to below-knee amputation will have a major impact on functionality. The pilot must be able to demonstrate the ability to fully operate the rudders, or modify the aircraft accordingly. A double above-knee amputee is unlikely to be able to fly an unmodified aircraft due to the inability to generate sufficient force to operate the rudders.

Upper limb prostheses that are most functional are not necessarily the most 'natural' in appearance, often being hooks. The loss of digits makes fine manipulation difficult.

**Shoulder Injury**

**Rotator cuff injury.** Most commonly, this is due to supraspinatus tear, and recovery is good. Physiotherapy, with up to three steroid injections can be helpful. Arthroscopic inspection can be useful to identify the pathology more accurately. Ultrasound is not helpful unless the sonographer is very experienced. Time to recover can be from 6 weeks to two years. Once able to move the affected arm through an arc in the functional area, the individual can be returned to flying. Surgical repair is sometimes necessary in the young patient.
Shoulder instability. Three episodes of subluxation or dislocation in a single direction should lead to surgical repair. Where there is multidirectional instability with ligamentous laxity, surgical repair is unhelpful, and effort should be directed to conservative treatment of maximal rehabilitation effort. Strength and balance of muscles is needed to overcome the ligamentous injury.

Frozen shoulder. Early treatment of frozen shoulder with local and oral corticosteroids has been reported as beneficial. In chronic, established cases the orthopaedic aim is to break down adhesions limiting the range of movement and causing pain. Early intervention with manipulation under anaesthesia and steroid injections usually results in recovery. Once again, ability to move in the functional arc for flying is needed before return to flying should be considered.

**Lateral Epicondylitis**

This condition may be encountered in a number of circumstances, usually involving repetitive activities. The core of the treatment is physical therapy with graduated exercises to increase strength and endurance, remediation of the causative activity, and steroid injections into the affected tendon complex are beneficial. Resumption of activity too soon often results in recurrence. Each case should be considered in its merits, based on forearm strength and exacerbating actions.

**Carpal Tunnel Syndrome**

Typical CTS symptoms involving the median nerve distribution at the wrist, will often respond to conservative treatment modifying activities combined with steroid injection. Surgery is usually curative. With arthroscopic surgery in experienced hands, the individual can return to work within four weeks, while open surgery recovery requires somewhat longer. Return to flying will be based on an assessment of strength and endurance of the wrist.

**Upper Limb Fractures**

The presence of a plaster is a difficult situation to assess. It is best to not attempt to fly while there is an upper limb plaster in place. A better option from the aviation perspective is usually a pin, possibly with a small splint, which will permit continued activity.

Each case needs to be based on functional capability, which should be assessed by the DAME. If there is a desire to fly while there is a plaster in place, or there is doubt about functional capacity, then a functional test, carried out by a CFI or ATO would be appropriate.
Lower Limb Fractures

Lower limb fractures often take 6 months to heal adequately for normal function. However, many fractures are pinned, or can have an inflatable plaster that is only inflated when putting stress through the bone. Thus, most lower limb fractures will be compatible with continued flying. The DAME should assess likely functional limitations of aviation relevance.

Knee Derangement

Following an anterior cruciate ligament rupture, there will be a period where the pilot is unfit for flying. Without surgery, this is likely to be around six weeks. With surgery, the expectation would be around three months. Medial collateral ligament tear will have little impact on flying.

Arthrodesis

Following an arthrodesis, activity is generally near normal. For flying, a hip arthrodesis will be nearly impossible due to the limitation of mobility. Knee arthrodesis is difficult and will require in flight assessment, while ankle arthrodesis should not produce significant difficulties.
2. Medical Aspects
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2.12 Ear, Nose and Throat and Hearing

2.12.1 Ear, Nose and Throat Standard – CASR Part 67

The ear, nose and throat standards are found in the following paragraphs of CASR Part 67:

- **CASR 67.150** For medical standard 1  
  CASR 67.150(7)  
  Table 67.150  
  1.27 – 1.28

- **CASR 67.155** For medical standard 2  
  CASR 67.155(7)  
  Table 67.155  
  2.26 – 2.27

- **CASR 67.160** For medical standard 3  
  CASR 67.160(7)  
  Table 67.160  
  3.25 – 3.26

2.12.2 Hearing Requirements Standard – CASR Part 67

The hearing requirements standards are found in the following paragraphs of CASR Part 67:

- **CASR 67.150** For medical standard 1  
  CASR 67.150(7)  
  Table 67.150  
  1.29 – 1.30

- **CASR 67.155** For medical standard 2  
  CASR 67.155(7)  
  Table 67.155  
  2.28 – 2.30

- **CASR 67.160** For medical standard 3  
  CASR 67.160(7)  
  Table 67.160  
  3.27 – 3.28

2.12.3 Examination of the Ear

There should be no signs of active disease of the middle ear cavity. Applicants should be able to ventilate the middle ear.

Perforations of the tympanic membrane are acceptable, however the cause of the condition should be sought and investigations initiated, if appropriate.
2.12.4 Hearing

An applicant for a Class 2 Certificate must be able to hear an average conversational voice at two metres with the back to the examiner. Accordingly, applicants who are deaf in one ear may pass.

More rigid standards apply to professional licence holders. Audiograms are required for initial Class 1 and 3 and at defined intervals thereafter.

If any doubt arises as to the acceptability of an applicant's hearing, an audiogram should be obtained and, if appropriate, specialist consultation recommended. The audiogram printout should be enclosed with the medical report for initial issue Class 1 and 3 examinations.

Audiograms are acceptable from facilities other than Australian Hearing Services (AHS) facilities. Applicants who are found for the first time to be within 10dB of the limits stated in the schedule should be retested by AHS. Where the deficit is long-standing and has been previously recorded, a non-AHS audiogram will be acceptable provided it demonstrates no significant deterioration.

Where a supplementary speech test is required, this can only be performed by AHS as the calibrated tapes and other equipment required are not available elsewhere. If the applicant fails the speech-based hearing test, in some cases an in-flight test may be offered if he/she has a high level of aeronautical experience. Such an operational check will involve evaluation of relevant aspects of the applicant’s hearing by a CASA Flying Operations Inspector or an Authorised Testing Officer with test material transmitted from a control tower. Ideally the test should be conducted in the class of aircraft, which is the same as that which the applicant normally operates or intends to operate.

Applicants for Class 2 Certificates may wear hearing aids during testing. Any applicant who meets the hearing standard in this way is required to wear the aid during all communications on the ground that relate to the conduct of a flight. Adequate amplification during flight may be achieved by the use of headphones. Headphones with ear cups have the added advantage of blocking out aircraft noise. All pilots should be encouraged to fly with headphones, in the interests of improving hearing and for hearing conservation.

2.12.5 Vestibular Function

Any history of vertigo or dizziness should be fully investigated and the presence of nystagmus noted. If there is concern about vestibular function, referral for caloric testing and electronystagmography should be considered.
2.12.6 Speech

Any significant speech impediment or stuttering should be reported, and full details are required. As a minimum, reports from an ENT specialist and from a speech pathologist should be obtained and forwarded to Aviation Medicine Section, together with the DAME’s own assessment of the condition and its likely effects on the safety of air navigation.

2.12.7 Sinuses

Applicants with acute sinusitis are "temporarily unfit" for aviation duties. Chronic sinusitis is unacceptable until appropriately referred, treated and improved.
2.13.1 Introduction

The increasing use of drugs, both prescribed and self-administered, within the Australian community, presents a significant challenge to DAMEs when determining an applicant’s fitness for aviation related duties. All drugs, even those purchased “over the counter (OTC)”, may have adverse effects that may render aircrew members or air traffic controllers unsafe to fly or to perform their normal duties.

General Principles

As a general principle, DAMEs should assume all medications are hazardous for aviation operations until demonstrated otherwise.

When assessing whether a pilot or Air Traffic Controller (ATC) taking medication is fit for aviation-related duties, two principal issues should be considered:

- The potential for the underlying medical condition to affect fitness for flying or controlling duty
- The potential for the treatment (including drug therapy) to reduce fitness for flying or controlling duty.

The following characteristics of specific compounds will influence the limitations on their safe use in the aviation environment:

- Unwanted, dose-related drug effects (e.g. blurred vision or drowsiness)
- Hypersensitivity/allergic reactions
- Idiosyncratic effects
- Drug side effects that may occur in some of the population (e.g., nausea, liver damage or bone marrow suppression)
- Drug combination effects – potentiation
- Drug interactions; particularly with alcohol, to increase risk of side effects or reduce activity of the drug/s.
Virtually all drugs unacceptable for aviation duties, regardless of the nature of the disorder being treated, have one or more of the following effects:

- CNS depression
- CNS stimulation
- Autonomic nervous system disturbance
- Disturbance of equilibrium.

**Determination of Fitness for Aviation Duty when Taking Medications**

It is not practicable in this chapter to indicate whether a specific drug or even class of drug is always compatible with safe flying or controlling. Rather, this chapter provides a general overview of many commonly used medications and their use in the flying environment. Whenever a DAME is in doubt about a pilot or controller who is taking a drug or medication, advice should be obtained from the CASA Aviation Medicine Section.

With regard to their effect on fitness for aviation duties, medications may be divided into five groups:

A. Those medications considered safe when flying or controlling.

B. Those medications generally considered compatible with aviation duties without restrictions once the possibility of idiosyncratic reaction has been eliminated (generally after a period of ground trial). Applicants using these substances may be cleared to exercise the privileges of their licences by a DAME.

C. Those medications which may be compatible with aviation duties, but which require a specific assessment by CASA. Only CASA can clear pilots and ATCs to use these drugs while performing aviation-related duties.

D. Drugs that are not compatible with flying or ATC duties.

E. Those medications that do not fit any of the above groups, or where there is uncertainty. In such cases, the DAME should either:
   - Contact CASA’s Aviation Medicine Section prior to any decision to certificate or not certificate a licence holder or applicant; or
   - Not endorse the certificate and refer the matter to AMS for determination.
A. Medications compatible with flying or controlling

The following medications may be taken without consultation:

- Simple analgesics such as single doses of aspirin, paracetamol, and ibuprofen to provide analgesia may be used for minor self-limiting conditions. Paracetamol is preferable as there is less risk of gastric irritation. Medications containing Codeine should not be used for this purpose.

- Simple antacids may be used for mild isolated episodes of gastric disturbance. Mixtures containing anticholinergics or antispasmodics should not be used by an applicant engaged in aviation duties. Simple antacids do not include H₂ receptor antagonists.

- Antidiarrhoeals such as kaomagma, kapectate and bismuth subcitrate are acceptable for mild afebrile diarrhoea.

- Nasal sprays such as oxymetazoline or phenylephrine, to be used as a ‘get-me-down’ should unexpected ear or sinus block occur during flight.

- Non-prescription suppositories and topical anorectal ointments/creams used to treat simple haemorrhoids.

- Topical medications including antiseptics, topical acyclovir, antifungals, weak steroid creams or benzoyl peroxide used for minor wounds and skin conditions, vaginal creams/pessaries and suppositories.

  **Note:** Schedule 4 (prescription only) items such as topical antibiotics and tretinoin skin applications are not included.

- Oral Contraceptive Pill (combined OCP or mini-pill), injectable progesterone contraceptives and implantable progesterone contraceptives.

- Nicotine gum, patches or sprays used for smoking cessation.

- Steroid nasal sprays used to treat hay fever.

- Moistening or simple astringent eye drops

B. Medications requiring ground trial before DAME approval of use when flying or controlling

Pilots and ATCs taking the following medications require a ground trial (and/or AMS consultation) prior to DAME approval to fly or control:
2.13 Medication – Drugs and Flying/Controlling

- **Anaesthetics.** Medical certificate holders require clearance from a medical practitioner following the administration of any anaesthetic agent:
  - Minimum of 12 hours following local or regional (including dental) anaesthetics. (The condition for which the anaesthetic has been administered must also be considered prior to returning an individual to flying or controlling duties).
  - Minimum of 48 hours following general, spinal or epidural anaesthetic. This proscription includes drug-induced sedation. (The condition for which the anaesthetic etc has been administered must also be considered prior to returning an individual to flying or controlling duties).

- **Hypnotics.** Medical certificate holders should not fly or control for at least 12 hours after ingesting the sleep-inducing agent Temazepam. Medical certificate holders should not fly or control for at least 8 hours after using the sleep-inducing agent Zolpidem. Pilots and ATCs who use Temazepam or Zolpidem should not combine these drugs with alcohol. The use of the sleep-inducing agent Triazolam is not compatible with flying or controlling duties due to its potential CNS side effects. The use of Melatonin is not supported by CASA due to variation in its formulation and variability in its effects.

- **Antibiotics (oral and topical).** Medical certificate holders may continue to undertake flying or controlling duties when taking antibiotics provided:
  - the infectious condition being treated will not significantly interfere with aviation-related activities and will not be exacerbated by the specific operating environment, and
  - the prescribing medical practitioner or DAME has determined there are no adverse drug reactions from the antibiotic which has been prescribed. This would normally involve a short (approximately 48 hour) ground trial or previous use of the same antibiotic.

- **Immunisations.** Medical certificate holders should not undertake aviation-related duties for 24 hours after receiving the following vaccinations (primary and boosters):
  - Adult diphtheria and tetanus
  - Poliomyelitis
  - Hepatitis A & B
  - Measles, mumps, rubella
  - Yellow fever
  - Typhoid
  - Tuberculosis (Mantoux Test or Bacille Calmette-Guerin);
  - Influenza
  - Varicella
  - Meningococcal
  - Pneumococcal
  - Cholera.
Class 3 medical certificate holders receiving these vaccinations will usually remain fit for duty, but should consult a GP or DAME in individual cases of doubt.

After receiving the following immunisations (primary and boosters) there should be no aviation-related duties for a minimum of 72 hours:

- Japanese Encephalitis.

### Non-sedating antihistamines

#### C. Medications which may be compatible with aviation duties, but which require specific assessment by CASA

For many of the following medications, it is important to note that they will be prescribed to treat particular conditions. Refer to the relevant section regarding certification requirements for that condition as well as to the issues discussed here.

CASA approval is required prior to pilots and ATCs who are taking the following classes of medications returning to flying or controlling duties:

- **Sedating Antihistamines:**
  - These should only be used when there is at least 12 hours between use and commencing aviation-related duties.

- **Antihypertensives:**
  - ACE inhibitors
  - Calcium channel blockers
  - Diuretics
  - Beta blockers.

- **Antiarrhythmics:**
  - Quinidine
  - Disopyramide
  - Verapamil
  - Amiodarone
  - Digoxin.

- **Gout medications:**
  - Allopurinol (colchicine is not usually suitable)
  - Probenecid
  - Non-steroidal anti-inflammatory medications.

- **Hypolipidemtic drugs:**
  - HMG-COA reductase inhibitors
  - Gemfibrozil (gemfibrozil and statin medications are not to be used together)
  - Cholestyramine (colestipol is not suitable).
2.13 Medication – Drugs and Flying/Controlling

- **Ophthalmological preparations:**
  
  It is possible for patients to absorb sufficient beta-blocker through ocular administration to affect cardiovascular response to exertion/exercise.
  - Timolol (glaucoma)
  - Betaxolol (glaucoma).

- **Thyroid disease:**
  - Thyroxine requires a 14-day trial.

- **Antidepressants.**
  - Selected non-sedating selective serotonin reuptake inhibitors (SSRIs) require a minimum of 28 days ground trial. The underlying condition should be considered prior to returning the aviator to duty. MAOIs and tricyclic antidepressants are not generally considered compatible with aviation-related duties. (Also see section 2.6 Psychiatry.)

- **Other medications:**
  - Oral acyclovir or famcyclovir for genital herpes
  - Griseofulvin or terbinafine for systemic antifungal therapy requires a 28-day trial. Monthly liver function testing is required
  - Omeprazole for oesophagitis and peptic ulceration maintenance therapy, following endoscopic confirmation of ulcer healing
  - Ranitidine for peptic ulceration maintenance therapy, following endoscopic confirmation of ulcer healing
  - Clomiphene to enhance oogenesis
  - Sucralfate for non-ulcerative GI symptoms
  - Tetracycline (low dose, for long term treatment of acne)
  - Sulfasalazine for prophylaxis of well controlled ulcerative colitis
  - Sulfamethoxazole/trimethoprim for chronic urogenital tract infections.

When these classes of medications are prescribed, the following actions should be taken:

- **Ground trial:** The length of the ground trial will be determined on a case-by-case basis in consultation with CASA Aviation Medical staff, and will also depend on control of the underlying disorder and any side effects of the medication.

- **Consultation:** The DAME should contact CASA Aviation Medicine Section to discuss specific requirements for an applicant using or proposing to use any medication whose side effect profile is unknown or of possible concern.
D. Medications not acceptable for/not compatible with aviation related duties

The following medications are not compatible with aviation related duties and are never to be approved for use by a medical certificate holder without prior specific written approval by CASA.

- Narcotics
- Insulin
- Amphetamine
- Cytotoxics
- Psychotropic medications
- Anticoagulants
- Nitrates
- Complex antidiarrhoeals. Mixtures containing antispasmodics (eg, Lomotil, Imodium) are not usually compatible with aviation-related duties.

E Other medications such as vitamins, minerals and herbal preparations

Aircrew are to treat herbal medications as they would any other OTC medication. There is a potential for unforeseen consequences when taking such preparations and aircrew and ATCs should consult a DAME for advice before taking such medications and performing aviation-related duties.

Vitamins, minerals and dietary supplements

In Australia, all medicinal therapeutic products must carry an AUST L or AUST R number on the label, unless exempt. Vitamins and minerals are considered listed therapeutic goods meaning quality and safety factors have been assessed by the Therapeutic Goods Administration. In general, pilots and ATCs should not exceed the Recommended Daily Allowances for these products.

Herbal preparations

Herbal preparations are widely available in the community, and are seen by many as a “natural” alternative to conventional medicine. Unfortunately, such agents are not always subject to the same stringent regulations that apply to registered medicinal compounds as noted above. In addition, many of these preparations contain agents that may interact with other drugs and have the potential to cause side effects that are incompatible with flight safety. CASA considers routine use of herbal preparations as being incompatible with flying or controlling duties.
Herbal preparations are derived from plant parts or oils. One should bear in mind that there are no standards for quality, potency, safety or efficacy in their manufacture. Identical products may differ markedly between manufacturers or batches by the same manufacturer. Additionally, many drugs are derived from the same plants used in the herbal preparations. Therefore, many herbal preparations have the same potential side effects as manufactured drugs.

Several herbal preparations present particular threats to aviation safety, alertness, or physical well-being. Below are some of the herbal preparations known to be potentially dangerous.

- **Hallucinogens.** The following may cause hallucinations or disorientation:
  - Californian poppy
  - European mandrake
  - Kava-kava
  - Magic mushrooms
  - Nutmeg (in doses greater than a tablespoon)
  - Periwinkle
  - Thorn apple
  - Yohimbe bark.

- **Sedatives.** The following may cause drowsiness, slow reaction time, or disorientation:
  - Celandine
  - Deadly Nightshade
  - Hemlock
  - Henbane
  - Hops
  - Indian snakeroot
  - Jimson weed
  - Jin bu huan
  - Opium poppy
  - Passion flower
  - Scopolia
  - Skullcap
  - Valerian
  - Wild lettuce
  - Wolfsbane.
2.13 Medication – Drugs and Flying/Controlling

- **Cardiovascular effects.** The following may cause heart palpitations or precipitate myocardial ischaemia/infarction.
  - Broom
  - Ephedra
  - Indian snakeroot
  - Lily of the Valley
  - Pheasant’s eye
  - Purple foxglove
  - Squill
  - Stophanthus
  - White squill
  - Yellow foxglove.

- **Liver poisons.** The following may cause drowsiness, slow reaction time, or disorientation:
  - Borage
  - Chapperal
  - Colts foot
  - Comfrey
  - Germander
  - Life root
  - Thread leafed groudse.

The DAME often lacks clinical information sufficient to be able to quantify the aeromedical risk from use of herbal preparations. The following questions will be of benefit in evaluating the safety (or otherwise) of these agents:

- Is the use of the preparation due to signs or symptoms that suggest an underlying medical problem separate from the preparation in question?
- Is any component known to have neuropsychotropie effects?
- Is the preparation likely to contain unlabelled or incorrectly labelled ingredients?
- Is the preparation being used in a dose range far outside that of current experience or in an extremely concentrated form?
- Is any component of the preparation known to cause physical harm (even infrequently, unless the quantified incidence of adverse effects is known)?
- Is the preparation an alcohol-based tincture, tonic or elixir?

If all answers are negative, it is difficult to justify prohibition of the particular agent. Any positive answers must be dealt with by education, treating the underlying condition, not endorsing the medical certificate, or referring the matter to Aviation Medicine Section at CASA.
2.14 Malignancy

2.14.1 Introduction

Malignancy poses a threat to flight safety for a number of reasons including:

- Direct effect(s) of the primary tumour
- Effect(s) of secondary spread
- Effect(s) of treatment modalities
- Psychological effect
- Cachexia
- Endocrine or Biochemical disturbances.

Any pilot or Air Traffic Controller (ATC) diagnosed with a malignancy must refrain from aviation or air traffic control duties until fitness to return to such duties is assessed by CASA.

Automatic return to flying or controlling status should not be assumed. Some pilots and ATCs may be medically certificated following diagnosis and adequate treatment of their malignancy, provided there is an adequate program of ongoing surveillance. Others will require a lengthy period prior to certification due to ongoing symptoms or the risk of recurrence of the primary or metastatic spread. In some circumstances re-certification will not be approved.

Prior to medical certification on a pilot or ATC suffering from cancer, CASA must be sure that an applicant:

- Has recovered from the primary treatment
- Has no sign of residual tumour, of tumour spread or of secondary manifestations of tumour
- Is psychologically stable enough to undertake aviation duties.

Re-certification will depend on the likelihood and type of recurrent disease and the risk that it will adversely affect flight safety.
2.14.2 Principles of Aeromedical Certification of Pilots/ATCs with Malignancy

When considering the aeromedical risk (and therefore the risk to aviation safety) posed by a pilot or ATC suffering from a malignancy, CASA will evaluate:

- Cancer specific issues such as:
  - The type of cancer (tissue and histological diagnosis)
  - Likelihood of recurrence
  - Site of recurrence
  - Presence of any para-neoplastic syndromes
  - Potential for a recurrence to cause overt or subtle in-flight incapacitation.

- Issues related to the treatment of the cancer.

2.14.3 Cancer Specific Issues

Histological variants of a particular tissue cancer may behave biologically differently from other variants. Therefore, when assessing the aeromedical risk of a pilot or ATC with a malignancy, accurate tissue diagnosis of the malignancy is essential.

Complications of the Malignancy

Potential complications of malignancy will affect CASA’s assessment of fitness for aviation related duties. Malignancy may lead to pain, wasting, neuropathy, nausea, anorexia, seizures, hypercalcaemia, hyperuricaemia, viscus obstruction, and organ failure. Some cancers have para-neoplastic syndromes associated with their presence. These syndromes result from excessive or ectopic hormones synthesized by a tumour, immune complexes, ectopic receptor production, or release of physiologically active compounds and may manifest in a variety of ways. Most para-neoplastic syndromes have serious implications for aviation safety.

Likelihood of Recurrence

Figure 1 depicts the overall survival curve for individuals diagnosed with a theoretical malignancy. For most cancer types, annual recurrence rates can be calculated from survival curves. (As cure following recurrence is rare, overall survival approximates recurrence).
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2.14 Malignancy

Recurrence rates are greatly influenced by the stage of disease when primary treatment occurred. Many cancers are staged using a TNM (Tumour, Node, Metastasis) classification. Figure 2 depicts the variation in survival rates for a theoretical cancer according to the degree of spread evident at diagnosis.

**Tumour Marker**

Tumours may synthesize proteins that produce no clinical symptoms, eg, β-human chorionic gonadotropin, α-fetoprotein, carcinoembryonic antigen, CA 125, and CA 153. These protein products may be used as tumour markers in the serial evaluation of patients for determining disease recurrence or response to therapy. These markers may assist CASA in assessing the suitability of a pilot or ATC to return to aviation duty, as they can often be valuable in tracking response to treatment or recurrence of disease.
Site of recurrence

Each tumour has a characteristic pattern of recurrence. Thus for a theoretical tumour, metastases might occur according to the distribution indicated in Table 1.

<table>
<thead>
<tr>
<th>Site</th>
<th>Incidence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local and lymph nodes</td>
<td>60</td>
</tr>
<tr>
<td>Liver</td>
<td>20</td>
</tr>
<tr>
<td>Lung</td>
<td>10</td>
</tr>
<tr>
<td>Bone</td>
<td>5</td>
</tr>
<tr>
<td>Bone marrow</td>
<td>3</td>
</tr>
<tr>
<td>Brain</td>
<td>2</td>
</tr>
</tbody>
</table>

Risk of particular metastasis causing incapacitation

Several assumptions are made when assessing the risk of a particular metastasis causing incapacitation (either subtle or overt). For a theoretical cancer, recurrence in a regional lymph node carries a relatively small risk of incapacitation. On the other hand, brain metastasis has a near-100% potential for incapacitation (whether sudden due to a fit or bleed, or subtle as a result of pressure effects or headache etc). Thus the incapacitation risk weighting for a theoretical cancer may be as depicted in Table 2.

<table>
<thead>
<tr>
<th>Site</th>
<th>Incapacitation weighting (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local and lymph nodes</td>
<td>1</td>
</tr>
<tr>
<td>Liver</td>
<td>5</td>
</tr>
<tr>
<td>Lung</td>
<td>5</td>
</tr>
<tr>
<td>Bone</td>
<td>5</td>
</tr>
<tr>
<td>Bone marrow</td>
<td>20</td>
</tr>
<tr>
<td>Brain</td>
<td>100</td>
</tr>
</tbody>
</table>

Total risk of incapacitation

From the parameters defined above, a total risk of incapacitation can be calculated:

- Recurrence rate per year for the particular stage of the malignancy
- Frequency of metastatic disease in a particular organ
- Risk that metastasis in that organ will cause incapacitation.
Thus for an early stage cancer, the result of a calculation of the risk of incapacitation from brain metastasis may be:

3% x 3% x 100% = 0.09% for the first year

For a theoretical late stage cancer from bone marrow metastases, the risk may be:

15% x 3% x 100% = 0.45% for the first year.

In order to determine the overall risk, it is necessary to add the risks from all the possible recurrence sites.

2.14.4 Treatment Related Issues

In general, cancer is treated in one (or a combination) of the following ways:

- **Surgery** is the commonest treatment for malignant disease, and often is the only treatment. Aeromedical certification after surgery for cancer depends on the extent and success of the operation. Complications of surgery are considered on their merits, taking into account the underlying medical condition and the overall health of the affected individual.

- **Radiotherapy** is usually delivered as an intensive course. The aim may be curative, for example where an isolated group of lymph nodes have been shown to contain malignant cells, or as adjuvant therapy where lymph nodes are assumed to contain metastatic tumour. During the active part of radiotherapy treatment, pilots and ATCs will be assessed as temporarily unfit for duty. Following radiotherapy many patients suffer non-specific systemic effects, such as tiredness, malaise and nausea, which makes it inappropriate for them to partake in aviation activities at least until such effects have resolved. Occasionally there are long-term effects after radiotherapy, such as scarring, which may preclude fitness for aviation duties.

- **Chemotherapy**. During acute chemotherapy treatment (whether curative or adjuvant), pilots and ATCs will be assessed as temporarily unfit, as all chemotherapy drugs are cytotoxic, and frequently have a significant effect on normal tissue, such as rapidly dividing cells in the bone marrow. Once active chemotherapy has ceased and side effects have resolved, aeromedical certification may be possible and will be considered on a case-by-case basis. In some cases low doses of chemotherapy agents may be prescribed as maintenance therapy. Where CASA considers that such medications do not reduce aviation safety, aeromedical certification may be considered, also on a case-by-case basis.
2. Medical Aspects
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- **Hormonal therapy.** Endocrine therapy is used as part of the treatment of some cancers (such as hormone and anti-hormone treatment following breast and prostate cancer). Pilots and ATCs may be returned to flying or controlling if there are no side effects from their hormonal therapy. In all cases, the decision to return to duty while on cancer chemotherapy will be made by CASA Aviation Medicine Section (AMS), on a case-by-case basis, when absence of adverse disease effects is confirmed.

- **Complementary or alternative medicine.** These modalities are commonly used by patients in the treatment of malignancy, particularly where the primary treatment modalities have failed to produce a cure. Where such treatments are used in the presence of continued active disease, the applicant is assessed as unfit. Where the treatment is used to prevent onset of malignancy or recurrence, the treatment will be considered on a case-by-case basis, with regard to the individual’s overall health and the potential effect of the treatment. Herbal medications are discussed in Section 2.13 Medication. All such cases should be referred to CASA AMS for consideration.

2.14.5 Specific Malignancies

The commonest forms of malignant disease in the Australian pilot and ATC population are (in order):

- Prostate cancer
- Malignant melanoma
- Bowel (colon) cancer
- Non-Hodgkin’s lymphoma
- Cancer of the testis (multiple types)
- Bladder cancer
- Kidney cancer
- Cancer of the rectum/anus
- Breast cancer
- Hodgkin’s lymphoma.

The following discussion relates to the five most commonly encountered malignancies in the aviation population in Australia, as well as Hodgkin’s Disease. Information on re-certification following diagnosis with such malignancies is to be taken as guidance and indicative only. CASA will address each case individually and make a decision based on its unique issues. In general, DAMEs and certificate applicants may anticipate an outcome along the lines described as a way to plan for possible grounding periods. Applicants should endeavour to provide specialist evidence and opinion to refute the guidance below should there be a request to return to multi-crew or solo flying or controlling prior to the times indicated.
Prostate Cancer

Adenocarcinoma of the prostate is the commonest malignancy in men aged 50 years or more in Australia, and the incidence increases with each decade of life. Hormonal influences undoubtedly play a role in the aetiology of adenocarcinoma. Grading is based on architectural patterns and is commonly reported as the Gleason score: the primary (most prevalent) grade (1-5) plus the secondary (next most prevalent) grade (1-5); thus, it ranges from 2 (very well differentiated) to 10 (very poorly differentiated). Staging is described in Table 3.

Table 3: Staging of prostatic cancer

<table>
<thead>
<tr>
<th>Staging System</th>
<th>Characteristics of Tumour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whitmore</td>
<td>AJCC/TNM</td>
</tr>
<tr>
<td>A</td>
<td>T1</td>
</tr>
<tr>
<td></td>
<td>T1a</td>
</tr>
<tr>
<td></td>
<td>T1b</td>
</tr>
<tr>
<td></td>
<td>T1c</td>
</tr>
<tr>
<td>B</td>
<td>T2</td>
</tr>
<tr>
<td></td>
<td>T2a</td>
</tr>
<tr>
<td></td>
<td>T2b</td>
</tr>
<tr>
<td>C</td>
<td>T3</td>
</tr>
<tr>
<td></td>
<td>T3a</td>
</tr>
<tr>
<td></td>
<td>T3b</td>
</tr>
<tr>
<td>D</td>
<td>T4</td>
</tr>
</tbody>
</table>

AJCC = American Joint Committee on Cancer
TNM = tumour node metastasis

Symptoms, Signs, and Diagnosis

Prostatic cancer is usually slowly progressive and may cause no symptoms. In late disease, symptoms of bladder outlet obstruction, ureteral obstruction, and hematuria may appear. Metastases to the pelvis, ribs, and vertebral bodies may cause bone pain. Carcinoma is often diagnosed incidentally when malignant changes are found in the tissue removed during surgery for suspected benign prostatic enlargement.

Elevated serum acid phosphatase or Roy test (an enzymatic method) correlates well with the presence of metastatic prostate cancer, particularly in lymph nodes. Although acid phosphatase and Prostatic Specific Antigen (PSA) levels decline after treatment and rise with recurrence, PSA is the more sensitive marker for monitoring cancer progression and response to therapy. However, because serum PSA is moderately elevated in 30 to 50% of patients with benign prostatic hyperplasia (depending on prostate size and degree of obstruction) and in 25 to 92% of those with prostate cancer (depending on tumour volume), its role in early detection and staging is unclear. Significantly elevated PSA levels suggest extracapsular extension of tumour or metastases.
2.14 Malignancy

Prognosis and Treatment

Long-term local control—even cure—is possible. However, the potential for cure, even in patients with clinically localized cancer, depends on factors such as grade, stage, and pretreatment PSA level. For patients with low-grade, organ-confined tumours, survival is virtually identical to that for age-matched controls without prostate cancer.

Most patients elect to undergo definitive therapy with radical prostatectomy or radiotherapy. Radical prostatectomy is probably optimal for younger patients with longer life expectancy; they have the lowest risk of urinary incontinence. Radiotherapy may offer comparable results, especially in patients with low pretreatment PSA levels.

An asymptomatic patient with a locally advanced tumour or metastases may benefit from hormonal therapy with or without adjuvant radiotherapy. Hormonal therapy rarely uses exogenous estrogens, which pose an increased risk of cardiovascular and thromboembolic complications.

Medical Certification

Cancer of the prostate has a generally good prognosis, and tends to metastasise locally or to bone. Once primary treatment has been completed, certification will be possible where:
- There is no evidence of metastatic spread
- PSA has returned to normal
- There are no significant consequences of treatment, such as incontinence.

Should there be metastatic spread which has been controlled and PSA has returned to less than 10, certification will also be considered. Certification will be for no more than 12 months. Each CASA medical examination and report must be accompanied by a progress report from a urologist or oncologist, and a recent PSA level. If the applicant shows no signs of recurrence after three years from initial diagnosis, no further follow-up is required. Where there is metastatic spread surveillance will likely be lifelong. Provided no other medical conditions preclude it, there can be a return to regular certification procedures for age and Class.

Malignant Melanoma

Malignant melanoma is the second commonest malignancy in the Australian aircrew and ATC population. The incidence is rising. Sun exposure is a risk, as is family history and the occurrence of lentigo maligna, large congenital melanocytic naevus, and the dysplastic naevus syndrome.

About 40 to 50% of malignant melanomas develop from pigmented moles. Almost all of the rest arise from melanocytes in normal skin. Signs of malignant transformation should be carefully sought: change in size; change in colour, especially spread of red, white, and blue pigmentation to surrounding normal skin; change in surface characteristics, consistency, or shape; and signs of inflammation in surrounding skin, with possible bleeding, ulceration, itching, or pain.
Malignant melanomas vary in size, shape, and colour (usually pigmented) and in their propensity to invade and metastasize. This neoplasm may spread rapidly, causing death within months of its recognition, yet the 5-year cure rate of early, very superficial lesions is nearly 100%. Cure depends on early diagnosis and early treatment. The major types of malignant melanoma are:

- Lentigo maligna melanoma
- Superficial spreading melanoma: accounts for 2/3 of malignant melanomas
- Nodular melanoma: constitutes 10 to 15% of malignant melanomas

**Prognosis and Treatment**

Two classification systems are useful for evaluating melanomas:

- Melanoma thickness as measured from the granular layer of the epidermis to the greatest depth of tumour invasion, as described by Breslow.
- Anatomic level of invasion, as described by Clark. In Clark's classification, level I is confined to epidermis; level II extends into papillary dermis; level III extends further into papillary dermis, with expansion of this layer; level IV extends into reticular dermis; and level V extends into subcutaneous fat.

Increased Breslow thickness and deeper invasion (Clark level) correlate with poorer prognosis. The clinical type of tumour is less important to survival than the thickness of the tumour at the time of diagnosis.

Metastatic spread of melanoma occurs both via lymphatics and blood vessels. Local spread results in formation of nearby satellite papules or nodules that may or may not be pigmented. Direct metastasis to skin or internal organs may occur, and occasionally metastatic nodules or enlarged lymph nodes are discovered before the primary lesion is identified. Melanomas arising from mucous membranes have a very poor prognosis, although they often seem quite limited when discovered.

Treatment is by surgical excision. Although the width of margins is debated, most experts agree that a 1-cm lateral tumour-free margin is adequate for lesions <1 mm thick. Thicker lesions may deserve more radical surgery and sentinel node biopsy.

Thick malignant melanomas and regional or distant metastasis may be treated with chemotherapy. Prognosis is poor.
2. Medical Aspects
2.14 Malignancy

**Table 4: Five-year survival for malignant melanoma**

<table>
<thead>
<tr>
<th>Tumour Thickness (mm)*</th>
<th>5-Year Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76</td>
<td>98 - 100</td>
</tr>
<tr>
<td>0.76 - 1.5</td>
<td>90 - 94</td>
</tr>
<tr>
<td>1.51 - 2.25</td>
<td>83 - 84</td>
</tr>
<tr>
<td>2.26 - 3.0</td>
<td>72 - 77</td>
</tr>
<tr>
<td>&gt; 3.0</td>
<td>46</td>
</tr>
</tbody>
</table>

* Tumour thickness is very difficult to assess if histological signs of regression are present.

**Aeromedical Certification**

Following diagnosis of a malignant melanoma, CASA will not certificate a pilot or ATC for the first 12 months because of the risk of spread to organs such as the brain, lungs or bone. The associated risk of incapacitation is significant. In some circumstances where the prognosis is extremely positive, certification prior to 12 months may be considered.

**Class 1 and 3:** In the absence of recurrence, CASA will usually approve Class 1 and 3 certification as follows:

**Table 5: Post-malignant melanoma certification (Class 1 and 3)**

<table>
<thead>
<tr>
<th>Tumour thickness</th>
<th>Certification</th>
<th>Period post-diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>0.76 – 1.49 mm</td>
<td>Multicrew</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>24 months</td>
</tr>
<tr>
<td>1.5 – 2.24 mm</td>
<td>Multicrew</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>36 months</td>
</tr>
<tr>
<td>2.25 – 3.0 mm</td>
<td>Multicrew</td>
<td>24 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>48 months</td>
</tr>
<tr>
<td>&gt; 3.0 mm</td>
<td>Multicrew</td>
<td>24 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>60 months</td>
</tr>
</tbody>
</table>
Class 2: In the absence of recurrence, CASA will usually approve Class 2 certification as follows:

<table>
<thead>
<tr>
<th>Tumour thickness</th>
<th>Certification</th>
<th>Period post-diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>0.76 – 1.49 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>1.5 – 2.24 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>2.25 – 3.0 mm</td>
<td>As or with co-pilot</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>24 months</td>
</tr>
<tr>
<td>&gt; 3.0 mm</td>
<td>As or with co-pilot</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>36 months</td>
</tr>
</tbody>
</table>

Certification will be for no more than 12 months, and renewal medical examinations and reports must be accompanied by a progress report from the treating dermatologist or oncologist. These reports will be required for at least 3 years following return to unrestricted duties.

Colorectal (Bowel) Cancer

In Western countries, cancers of the colon and rectum account for more new cases of cancer per year than cancer of any other anatomical site except the lung. Colorectal cancer is the most frequent cause of death from visceral malignancies that affect both sexes. The incidence of this condition begins to rise at age 40 and peaks at age 60 to 75 years. Colorectal cancer spreads by direct extension through the bowel wall, haematogenous metastasis, regional lymph node metastasis, perineural spread, and intraluminal metastasis.

Symptoms, Signs, and Diagnosis

Adenocarcinoma of the colon and rectum grows slowly, and a long interval elapses before it is large enough to produce symptoms. Early diagnosis depends on routine examination. Symptoms depend on the lesion’s location, type, extent, and complications. In cancer of the rectum, the commonest presenting symptom is bleeding with defecation. Whenever rectal bleeding occurs, even with obvious haemorrhoids or known diverticular disease, coexisting cancer must be excluded. Simple, inexpensive testing of the stool for occult blood is advised as part of both screening and high-risk surveillance programs.

Elevated serum carcinoembryonic antigen (CEA) is not specifically associated with colorectal cancer, but levels are high in 70% of affected patients. If CEA is high preoperatively, and low after removal of a colon tumour, monitoring CEA may help to detect recurrence.
Treatment and Prognosis

Primary treatment consists of wide surgical resection of the colon cancer and regional lymphatic drainage. The choice of operation for rectal cancer depends on the tumour's distance from the anus and gross extent. Abdominoperineal resection of the rectum requires a permanent sigmoid colostomy. Surgical cure is possible in 70% of patients. The best 5-yr survival rate for cancer limited to the mucosa approaches 90% (stage I, Dukes’ A); with penetration of the muscularis propria, 80% (stage II, Dukes’ B); with positive lymph nodes, 30% (stage III, Dukes’ C).

Medical Certification

Issues dealing with colostomy and ileostomy are found in Section 2.9 Gastroenterology.

Following diagnosis of a bowel cancer, CASA will not usually certificate a pilot or ATC for the first 12 months because of the risk of spread to organs such as the brain, lungs or bone and the associated risk of incapacitation is significant. CASA will require the following information when considering the fitness of a pilot or ATC to return to aviation-related duties following the diagnosis of colorectal cancer: an annual report from the treating gastroenterologist and/or oncologist, including tissue diagnosis, staging and CEA level, for at least 5 years post-diagnosis.

In the absence of recurrence, CASA will usually approve certification as follows:

### Stage I

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>6 months</td>
</tr>
<tr>
<td>Solo</td>
<td>24 months</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solo</td>
</tr>
</tbody>
</table>

### Stage II

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>12 months</td>
</tr>
<tr>
<td>Solo</td>
<td>36 months</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solo</td>
</tr>
</tbody>
</table>
Designated Aviation Medical Examiner's Handbook
2. Medical Aspects
2.14 Malignancy

Approved by Assistant Director, Aviation Safety Standards Version 3.2: January 2005

Stage III

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>24 months</td>
</tr>
<tr>
<td>Solo</td>
<td>648 months</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class 2</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot</td>
<td>12 months</td>
</tr>
<tr>
<td>Solo</td>
<td>24 months</td>
</tr>
</tbody>
</table>

Non-Hodgkin’s Lymphoma

Non-Hodgkin’s Lymphoma is a malignant monoclonal proliferation of lymphoid cells in sites within the immune system, including lymph nodes, bone marrow, spleen, liver, and gastrointestinal tract. Pathological classification of non-Hodgkin’s lymphomas (NHL) is evolving, reflecting new insights into the cells of origin and the biological bases of these heterogeneous diseases. The course of NHL varies from indolent and initially well tolerated to rapidly fatal.

Incidence and Aetiology

NHL occurs more often than Hodgkin’s disease. Its cause is unknown, although, as with the leukaemias, substantial experimental evidence suggests a viral cause for some lymphomas. Primary CNS involvement and disseminated disease occur. In about 30% of cases, the lymphomas are preceded by generalized lymphadenopathy.

Pathology

The Working Formulation classifies NHL into prognostic categories having therapeutic implications as follows:

- **Low-grade lymphomas** (38%): Diffuse, small lymphocytic; follicular, small-cleaved cell; follicular mixed, small and large cell.

- **Intermediate-grade lymphomas** (40%): Follicular large cell; diffuse, small-cleaved cell; diffuse mixed, small and large cell; diffuse large cell.

- **High-grade lymphomas** (20%): Immunoblastic lymphoma; lymphoblastic lymphoma; small non-cleaved cell lymphoma (Burkitt's and non-Burkitt's types).

- **Miscellaneous lymphomas** (2%): Composite lymphomas; mycosis fungoides; true histiocytic; other, and unclassifiable types.
2.14 Malignancy

Symptoms and Signs
Although various clinical manifestations of NHL occur, many patients present with asymptomatic peripheral lymphadenopathy. Enlarged lymph nodes are rubbery and discrete and later become matted. Local disease is apparent in some patients, but most have multiple areas of involvement. Anaemia is initially present in about 33% of patients and eventually develops in most.

Staging
Localised NHL does occur, but the disease is disseminated when first recognized in about 90% of follicular lymphomas and 70% of diffuse lymphomas. The final staging of NHL is similar to that of Hodgkin's disease; however, it is more often based on clinical than pathological findings.

Table 7: Ann Arbor Staging of Hodgkin's Disease and Non-Hodgkin's Lymphoma

<table>
<thead>
<tr>
<th>Stage *</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>In one lymph node only</td>
</tr>
<tr>
<td>II</td>
<td>In two or more lymph nodes on the same side of the diaphragm</td>
</tr>
<tr>
<td>III</td>
<td>In the lymph nodes, spleen, or both and on both sides of the diaphragm</td>
</tr>
<tr>
<td></td>
<td>1 Above the renal vessels (eg, spleen; splenic, hilar, coeliac and portal nodes)</td>
</tr>
<tr>
<td></td>
<td>2 In the lower abdomen (periaortic, pelvic, or inguinal nodes)</td>
</tr>
<tr>
<td>IV</td>
<td>Extranodal involvement (eg, bone marrow, lung, liver)</td>
</tr>
</tbody>
</table>

*Subclassification E indicates extranodal involvement adjacent to an involved lymph node (eg, disease of mediastinal nodes and hilar adenopathy with adjacent lung infiltration is classified as stage IIE). Stages can be further classified by A to indicate the absence; or B to indicate the presence of constitutional symptoms (weight loss, fever, or night sweats). B symptoms generally occur with stages III and IV (20 to 30% of patients).

Initially, constitutional symptoms tend to be less common in NHL than in Hodgkin's disease and do not usually alter prognosis. Organ infiltration is more widespread in NHL, and the bone marrow and peripheral blood may be involved.

Prognosis and Treatment
The histopathology, stage of disease, and results of surface marker studies significantly influence the prognosis and response to treatment. Patients with T-cell lymphomas generally have a worse prognosis than those with B-cell types. Other factors that adversely affect prognosis are poor performance status, age >60 years, elevated LDH level, bulky tumour masses (diameter >10 cm), and more than two extranodal sites of disease.

A prognostic index for diffuse mixed, diffuse large cell, and immunoblastic lymphomas has been reported. The International Prognostic Index (IPI) considers five categories: age, performance status, LDH level, number of extranodal sites, and stage. Prognostic groups of low, low intermediate, high intermediate, and high risk may be defined.
Table 8: Outcome According to Risk Group as Defined by the International Prognostic Index

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Risk Factors (n)</th>
<th>Patients * (%)</th>
<th>Complete Response (%)</th>
<th>2-Yr Relapse-Free Survival (%)</th>
<th>5-Yr Relapse-Free Survival (%)</th>
<th>2-Yr Survival (%)</th>
<th>5-Yr Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>0 or 1</td>
<td>35</td>
<td>87</td>
<td>79</td>
<td>70</td>
<td>84</td>
<td>73</td>
</tr>
<tr>
<td>Low - intermediate</td>
<td>2</td>
<td>27</td>
<td>67</td>
<td>66</td>
<td>50</td>
<td>66</td>
<td>51</td>
</tr>
<tr>
<td>High - intermediate</td>
<td>3</td>
<td>22</td>
<td>55</td>
<td>59</td>
<td>49</td>
<td>54</td>
<td>43</td>
</tr>
<tr>
<td>High</td>
<td>4 or 5</td>
<td>16</td>
<td>44</td>
<td>58</td>
<td>40</td>
<td>34</td>
<td>26</td>
</tr>
</tbody>
</table>


A cure may be expected in 30 to 50% of affected patients with intermediate- and high-grade lymphomas undergoing myeloablative therapy. In low-grade lymphomas, it remains uncertain whether cure may be obtained with transplantation, although their survival rate is better than that of patients receiving secondary palliative therapy alone.

**Medical Certification**

Without a complete remission, return to aviation duties will not usually be considered. Once in remission, certification will usually be conducted on a case-by-case basis, using Table 9 (see next page) as a guide. The high rate of late recurrence limits the likelihood of an unrestricted Class 1 or Class 3 certification.

Table 9: Post-remission certification

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Class 1 &amp; 3 solo</th>
<th>Class 1 &amp; 3 multi-crew/no solo controlling</th>
<th>Class 2 solo</th>
<th>Class 2 as or with co-pilot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>4 years</td>
<td>2 years</td>
<td>2 years</td>
<td>1 year</td>
</tr>
<tr>
<td>Low - intermediate</td>
<td>5 years</td>
<td>2 years</td>
<td>3 years</td>
<td>1 year</td>
</tr>
<tr>
<td>High - intermediate</td>
<td>Certification unlikely</td>
<td>2 years</td>
<td>4 years</td>
<td>2 years</td>
</tr>
<tr>
<td>High</td>
<td>Certification unlikely</td>
<td>2 years</td>
<td>5 years</td>
<td>3 years</td>
</tr>
</tbody>
</table>

Timing is after a complete remission has been obtained.

Applications for renewal of a medical certificate must be accompanied by a progress report from the treating haematologist or oncologists detailing treatment, prognosis and current health. Certification will be for a maximum of 12 months until at least 5 years post-re-certification, and at least 3 years following return to unrestricted duties.
Hodgkin’s Disease

Hodgkin’s Disease is a localised or disseminated malignant proliferation of tumour cells arising from the lymphoreticular system, primarily involving lymph node tissue and bone marrow.

Incidence and Aetiology

Hodgkin’s disease has a bimodal age distribution that peaks at ages 15 to 34 and after age 60. However, the second peak may be an artefact of inaccurate diagnosis, because most cases diagnosed after age 60 are intermediate-grade non-Hodgkin’s lymphomas.

Pathology

Diagnosis depends on identification of Reed-Sternberg cells (large binucleated cells) in lymph nodes or at other sites.

Table 10: Histopathological Subtypes of Hodgkin’s Disease

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance</th>
<th>Incidence</th>
<th>Progression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lymphocyte predominant</td>
<td>Few Reed-Sternberg cells and many lymphocytes</td>
<td>3%</td>
<td>Relatively slow or indolent</td>
</tr>
<tr>
<td>Nodular sclerosis</td>
<td>Dense fibrous tissue surrounds nodules of Hodgkin’s tissue</td>
<td>67%</td>
<td>Intermediate or moderately progressive; relatively slow or indolent (occasionally)</td>
</tr>
<tr>
<td>Mixed cellularity</td>
<td>A moderate number of Reed-Sternberg cells with a mixed background infiltrate</td>
<td>25%</td>
<td>Intermediate or moderately progressive; aggressive</td>
</tr>
<tr>
<td>Lymphocyte-depleted</td>
<td>Numerous Reed-Sternberg cells and extensive fibrosis</td>
<td>5%</td>
<td>Aggressive</td>
</tr>
</tbody>
</table>

Symptoms and Signs

Symptoms and signs primarily relate to the site, amount, and extent of nodal mass involvement. Most patients present with cervical and mediastinal adenopathy and without systemic complaints. Other manifestations develop as the disease spreads through the reticuloendothelial system, generally among contiguous sites. The rate of progression varies according to histopathological subtype.

Diagnosis

Hodgkin's disease can be definitively diagnosed by lymph node biopsy that reveals Reed-Sternberg cells in a characteristic histological setting. Hodgkin's disease may be difficult to differentiate from lymphadenopathy caused by infectious mononucleosis, toxoplasmosis, cytomegalovirus, NHL, or leukaemia.
Staging

Radiotherapy, chemotherapy, or a combination of both is potentially curative, but the extent or stage of disease must first be determined. The Ann Arbor staging system (see Non-Hodgkin’s Lymphoma) is commonly used.

Treatment

Chemotherapy or radiotherapy regimens cure most patients.

- **Stage I and IIA disease** can be treated with radiotherapy. Such treatment cures about 80% of patients. Cure refers to being disease-free at 5 years post-therapy, after which relapse is very rare.

- For **stage IIIA1 disease**, total nodal irradiation results in an overall survival of 85 to 90%, with disease-free survival of 65 to 75% at 5 years.

- For **stage IIIA2 disease**, combination chemotherapy is generally used with or without radiotherapy of bulky nodal sites. Cure rates of 75 to 80% have been achieved.

- Because radiotherapy alone does not cure **stage IIIB disease**, combination chemotherapy alone or in conjunction with radiotherapy is required. Survival ranges from 70 to 80% (at 5 years).

- For **stage IVA and B disease**, combination chemotherapy has produced a complete remission in 70 to 80% of patients, with >50% remaining disease-free at 10 to 15 years. Patients who fail to achieve complete remission or who relapse within 6 to 12 months have a poor prognosis.

Medical Certification

CASA will not usually consider certification until at least 12 months following successful treatment. “Successful treatment” requires that the disease be in complete remission. Table 11 (below) provides guidance on the likely time before CASA will consider certification, assuming that there are no other significant health issues, no side effects from the treatment and ongoing complete remission or “cure” has been effected. All renewal medical examinations and reports must be accompanied by a progress report from the treating haematologist or oncologist.

Table 11: Likely certification timings

<table>
<thead>
<tr>
<th>Stage</th>
<th>Class 1 &amp; 3 solo</th>
<th>Class 1 &amp; 3 multi-crew/no solo controlling</th>
<th>Class 2 solo</th>
<th>Class 2 as or with co-pilot</th>
</tr>
</thead>
<tbody>
<tr>
<td>I and IIA</td>
<td>1 year</td>
<td>6 months</td>
<td>1 year</td>
<td>6 months</td>
</tr>
<tr>
<td>IIIA1</td>
<td>2 years</td>
<td>1 year</td>
<td>2 years</td>
<td>6 months</td>
</tr>
<tr>
<td>IIIA2</td>
<td>3 years</td>
<td>2 years</td>
<td>2 years</td>
<td>1 year</td>
</tr>
<tr>
<td>IIIB and IV</td>
<td>4 years</td>
<td>2 years</td>
<td>3 years</td>
<td>1 year</td>
</tr>
</tbody>
</table>
Testicular Cancer

Testicular tumours account for most solid tumours in males aged less than 30 years. Malignant testicular tumours arise from the primordial germ cell and differentiate to reveal seminoma, teratoma, embryonal carcinoma, endodermal sinus tumour (yolk sac tumour), and choriocarcinoma.

Symptoms, Signs, and Diagnosis

The usual presenting sign is a scrotal mass, sometimes associated with pain. Many patients discover the mass in association with minor trauma. Haemorrhage into the tumour may produce local pain and tenderness. Any firm mass in the testis is cause for immediate clinical suspicion of testicular tumour. Diagnostic studies should include radioimmunoassays for $\alpha$-fetoprotein and $\beta$-human chorionic gonadotropin. These markers, when elevated, indicate the presence of tumour; they are also valuable in follow-up of patients with proven testicular tumours, especially the non-seminomatous types.

Prognosis and Treatment

Prognosis depends on the histology and extent of the tumour. Survival rates are >95% at 5 years for seminomas and non-seminomas localized to the testis or low-volume metastases in the retroperitoneum. The 5-year survival rate for extensive retroperitoneal metastases or pulmonary or other visceral metastases is poorer and varies with site, volume, and histology of the metastases.

Radical (inguinal) orchidectomy, the cornerstone of treatment, provides important histopathological information for planning further therapy. These parameters can accurately predict the risk of occult lymph node metastases; so low-risk patients with normal x-rays and biomarkers may be candidates for surveillance protocols, especially patients with non-seminomatous germ cell tumours rather than seminomas. Otherwise, standard treatment for seminoma is irradiation after unilateral orchidectomy. For non-seminomatous germ cell tumours, standard treatment is retroperitoneal lymph node dissection.

Medical Certification

Stage 1 (non-metastatic disease):

- **Teratoma with orchidectomy only.** Following recovery from the surgery, unrestricted Class 1, 2 or 3 is usual. For the first 24 months, certification is for 6 months at a time. Each medical is to be accompanied by a report from urologist or oncologist, along with tumour marker levels. Tumour markers will usually rise before any anatomical disease is identifiable. After two years without recurrence, this can increase to 12 monthly certification, until 5 years post-diagnosis.
2.14 Malignancy

- **Seminoma with orchidectomy only.** There is a 15% relapse rate. This is usually monitored by serial CT or MRI scans. Unrestricted Class 1 or 3 certification will be delayed for 24 months post-surgery. Restricted Class 1 and 3 and unrestricted Class 2 is possible from recovery after surgery. Certification will be for 6 months for the first two years, then annual until 5 years post-diagnosis.

- **Seminoma with orchidectomy and radiotherapy.** As the cure rate is greater than 99%, unrestricted Class 1, 2 and 3 certification is possible as soon as the individual has recovered from the primary treatment. Certification again will be for 6 months for the first 2 years, then annual, and the medical must be accompanied by a progress report from the treating urologist or oncologist.

**Stage II/III (local metastatic disease):** The prognosis remains good compared with most other malignancies.

| Class 1/3 multi-crew/no solo controlling | Following recovery from primary treatment and disease free |
| Class 1/3 solo | 12 months following successful treatment |
| Class 2 as or with co-pilot | Following recovery from primary treatment and disease free |
| Class 2 solo | 6 months following successful treatment |

Renewal medical examinations and reports must be accompanied by a progress report from the treating specialist.

**Stage IV (disseminated disease):** Although 5-year survival is around 60-70%, this outcome is usually achieved only by prolonged chemotherapy. While chemotherapy is required, there will be no certification.

| Class 1/3 multi-crew/no solo controlling | 24 months following successful treatment |
| Class 1/3 solo | Certification unlikely |
| Class 2 as or with co-pilot | 12 months after last treatment and continued disease free |
| Class 2 solo | 24 months following successful treatment |

Renewal medical examinations and reports must be accompanied by a progress report from the treating specialist.

**Other Malignancies**

This section is not intended to provide detailed advice for all possible malignancies. Other malignancies may be discussed in the relevant organ system section of this *Handbook*. Otherwise, the guiding principles outlined above should be used. Where doubt exists, discussion with, or referral to, CASA Aviation Medicine Section should be undertaken immediately.
2.15 Differences between Australian Medical Certification and ICAO Medical Certification for International Operations

2.15.1 Currency of Medical Certification

ICAO commences periods of currency from the date of the medical examination, not from the date of CASA's assessment nor from the applicant's annivesary date. As an aide-memoire to applicants, CASA's medical certificates record the date on which the applicant's most recent medical examination was performed, to assist calculation of the medical certificate's currency for ICAO purposes. (See the Note below.)

2.15.2 Duration of Medical Certification

Class 1 medical certificates

For applicants with ATPL who are aged 40 years or more, ICAO demands a medical examination by a DAME every six months. That is, the currency of medical certification for this group extends for only six months from the date of the most recent medical examination.

Class 2 medical certificates

ICAO demands a medical examination by a DAME every two years for all Class 2 medical certificate holders. That is, the currency of medical certification for this group extends for only two years from the date of the most recent medical examination.

As an aide-memoire to applicants, CASA's medical certificates record the date on which the applicant's most recent medical examination was performed, to assist calculation of the medical certificate's currency for ICAO purposes. (See the Note below.)

**Note:** This has no effect on the notified currency of medical certificates when exercising licence privileges within Australian airspace.

This advice is provided to all Class 1 or Class 2 medical certificate holders whenever a CASA medical certificate is issued.
2.15 Differences between Australian Medical Certification and ICAO Medical Certification for International Operations
3.1.1 Questions to be Asked of CASA Employees for Superannuation Medicals

The following are questions to be asked during Superannuation Medicals (Class 3 Medical Certificate holders and pilots to be employed by CASA).

1. Have you ever been rejected:
   a. As a risk for life insurance?
   b. For admission to any employment for health reasons?
   c. For entry into any superannuation scheme?

2. Have you ever been retired or have your services ever been terminated from any employment on medical or invalidity grounds?

3. Are you receiving, or have you ever received:
   a. A pension or any other benefit from the Commonwealth Superannuation Scheme, the Defence Force Retirement and Death Benefits Scheme, or any other government or private superannuation scheme?
   b. Workers’ or employees’ compensation?
   c. A Social Security invalidity pension or sickness benefit?
   d. A Repatriation service pension?
   e. A Repatriation disability pension? If so, please state award rate.
Blank page
### 4.1.1 Aviation Medicine Telephone Contact as at December 2000

<table>
<thead>
<tr>
<th>CASA National Office (at the cost of a local telephone call)</th>
<th>131 757</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inquiries</td>
<td>(02) 6217 1641</td>
</tr>
<tr>
<td>Facsimile</td>
<td>(02) 6217 1640</td>
</tr>
</tbody>
</table>
4.2 CASA Offices

### 4.2.1 Head Office

Aviation Medicine Section  
Cnr Barry Drive & Northbourne Avenue  
CANBERRA ACT 2601  
GPO Box 1544  
CANBERRA CITY ACT 2601

### 4.2.2 Area Offices

<table>
<thead>
<tr>
<th>Office</th>
<th>Address</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney Basin</td>
<td>PO Box CPS Condell Park</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NSW 2200</td>
<td>(02) 97803050</td>
</tr>
<tr>
<td>NT and Kimberleys</td>
<td>PO Box 41196 Casuarina</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NT 0811</td>
<td>(08) 89432999</td>
</tr>
<tr>
<td>South Queensland</td>
<td>39 Navigator Place Hendra</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Qld 4051</td>
<td>(07) 3632 4051</td>
</tr>
<tr>
<td>North Queensland</td>
<td>PO Box 7740 Garbutt</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Qld 4814</td>
<td>(07) 4750 2671</td>
</tr>
<tr>
<td>NSW Country Office</td>
<td>GPO Box 2005 Canberra</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ACT 2601</td>
<td>131757</td>
</tr>
<tr>
<td>Victoria Tasmania</td>
<td>PO Box 20 Moorabbin</td>
<td></td>
</tr>
<tr>
<td></td>
<td>VIC 3189</td>
<td>131757</td>
</tr>
<tr>
<td>Central</td>
<td>PO Box 126 PBC Adelaide</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA 5950</td>
<td>(08) 8422 2904</td>
</tr>
<tr>
<td>West Australia</td>
<td>GPO Box 1082 CLOVERDALE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>WA 6105</td>
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</tr>
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</table>
5.1 Locations for Colour Vision Testing

### 5.1.1 Locations by State

<table>
<thead>
<tr>
<th>State</th>
<th>Location Details</th>
</tr>
</thead>
</table>
| **Australian Capital Territory** | Dr D Batagol  
Dickson Park Professional Centre  
Unit 5, Cnr Cowper and Antill Street  
DICKSON ACT 2602  
Tel: (02) 6249 7177 |
| **New South Wales**      | School of Optometry  
Ms Kerry Dreyer  
University of New South Wales  
KENSINGTON NSW 2033  
Tel: (02) 9385 4624 or (02) 9385 4628  
Dr P Duke  
135 Macquarie Street  
SYDNEY NSW 2000  
Tel: (02) 9247 3557 |
| **Northern Territory**   | Dr M I Mahmood  
Darwin Private Hospital  
Rocklands Drive  
CASUARINA NT 0810  
Tel: (08) 8920 6049 |
| **Queensland**           | Optometry Clinic, School Of Optometry  
O Block Kelvin Grove Campus  
Victoria Park Road  
KELVIN GROVE QLD 4059  
Tel: (07) 3864 5739  
Please specify on making an appointment, an "Aviation Colour Vision Test" to be supervised by Miss J Bevan.  
Dr W Talbot  
14 Fulham Rd  
PIMLICO TOWNSVILLE QLD 4812  
Tel: (07) 4775 1633 |
### 5. Colour Vision Testing

#### 5.1 Locations for Colour Vision Testing

<table>
<thead>
<tr>
<th>Location</th>
<th>Address</th>
<th>Contact Person</th>
<th>Phone Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queensland (cont.)</td>
<td>Captain Henry Thein (Northern Ports) Marine Operations, Queensland Transport 64-66 Tingira Street PORTSMITH CAIRNS QLD 4870</td>
<td>Ms Wendy Loton</td>
<td>Tel: (07) 4052 7400 Fax: (07) 40351127</td>
</tr>
<tr>
<td>South Australia</td>
<td>Dr J L Crompton 22 Walter Street NORTH ADELAIDE SA 5006</td>
<td></td>
<td>Tel: (08) 8267 3211</td>
</tr>
<tr>
<td>Tasmania</td>
<td>Defence Forces Recruiting Medical Section Anglesea Barracks, Davie Street HOBART TAS 7000</td>
<td></td>
<td>Tel: (03) 6237 7327</td>
</tr>
<tr>
<td>Victoria</td>
<td>Victorian College of Optometry 374 Cardigan St CARLTON VIC 3053</td>
<td>Dr J Parkes</td>
<td>Tel: (03) 9349 7400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note: Please state “Aviation Colour Vision Test” when making an appointment – to be supervised by Kay Lian</td>
<td></td>
</tr>
<tr>
<td>Western Australia</td>
<td>Ms Lisa Biggs Lincoln House No4 Ventnor Avenue WEST PERTH WA 6005</td>
<td></td>
<td>Tel: (08) 9485 1440</td>
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### 6.1.1 List of Forms

<table>
<thead>
<tr>
<th>Former Form No.</th>
<th>New CASA Form No.</th>
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<th>Available From</th>
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<tbody>
<tr>
<td>AVM 010</td>
<td>093</td>
<td>Authority Audiogram</td>
<td>J.S. McMillan</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Phone: 02 9795 1222 (Australia) +61 2 9795 1222 (International)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>P.O Box 136 Regents Park NSW 2143</td>
</tr>
<tr>
<td>AVM 006</td>
<td>097</td>
<td>Medical Questionnaire and Examination Form—R</td>
<td></td>
</tr>
<tr>
<td>AVM 012</td>
<td>098</td>
<td>Medical Questionnaire and Examination Form—O</td>
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<td>AVM 007</td>
<td>099</td>
<td>Eye Examination Report—V</td>
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<tr>
<td>AVM 005</td>
<td>172</td>
<td>Medical Certificate</td>
<td>Aviation Medicine Section, Canberra</td>
</tr>
<tr>
<td>AVM 008</td>
<td>755</td>
<td>Application for Appointment or Re-appointment as Designated Aviation Medical Examiner or Designated Aviation Ophthalmologist (under Regulation 6.02 of the Civil Aviation Regulations)</td>
<td>The CASA website</td>
</tr>
</tbody>
</table>
Blank page
BODY MASS INDEX CHART

Weight For Height Chart
(For Men and Women from 18 years onward)

Based on Body Mass Index (BMI) in Range of 18, 20, 25, 30.

\[
\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}
\]
1. Revision History
PEAK EXPIRATORY FLOW IN NORMAL SUBJECTS


The graph shows the peak expiratory flow (PEF) in liters per minute (L/min) for men and women across different age groups (in years) and heights (in cm). The standard deviation for men is 4.8 liters/min, and for women, it is 4.2 liters/min.

In men, values of PEF up to 100 L/min are less than predicted, and in women, less than 85 L/min are less than predicted, and are within normal limits.
1. Revision History
## Coronary Heart Disease

### Risk Factor Prediction Chart

1. **Find Points for each Risk Factor**

<table>
<thead>
<tr>
<th>Age (if Female)</th>
<th>Age (if Male)</th>
<th>HDL Cholesterol</th>
<th>Total Cholesterol</th>
<th>Systolic Blood Pressure</th>
<th>Other</th>
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<td>Age Pts</td>
<td>Age Pts</td>
<td>Age Pts</td>
<td>HDL-C Pts</td>
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<tr>
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<td>51-52</td>
<td>7</td>
<td>32-33</td>
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<tr>
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<td>-8</td>
<td>53-55</td>
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<td>34</td>
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<tr>
<td>34</td>
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<td>56-60</td>
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<tr>
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<td>37-38</td>
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<tr>
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<td>-4</td>
<td>68-74</td>
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<td>12</td>
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2. **Sum Points for all Risk Factors**

\[
\text{Age ( ) + (HDL-C ( ) = Total-C ( ) + SBP ( ) + Smoker ( ) + Diabetes ( ) + ECG-LVH ( ) Point Total}
\]

**NOTE:** Minus points subtract from total

3. **Look up risk corresponding to point total**

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**Modified from Chart by the American Heart Association, April 2002**
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

Published by permission of Dr. D.R. Jones from ‘Psychiatric Factors in Civil Aviation Medicine’. David R. Jones, MD, MPH. 10 January 2001. This is extracted from material provided by the FAA’s Civil Aviation Medicine Institute to its Basic Aviation Medical Examiner Course.

1. Clues that may be available before the examination begins:

   - You may know something of the reputation of the applicant in the community.
   - You may learn something from the applicant’s interaction with your office staff.

   Applicants with mental health problems may behave differently with office staff than with the examiner. Consider this if your staff points out behavioural problems or eccentricities.

2. Clues on Medical Certification form:

   - The applicant’s form contains careless or missing marks.
     
     Obtain the correct or missing data and ask why the mistake was made.
   - The class of certificate desired is not usual for this type of pilot.
     
     Find out how flying fits into the applicant’s lifestyle and plans.
   - The applicant does not live or work locally.
     
     Consider the type and stability of the applicant’s occupation.
     
     Discuss how the applicant came to pick you to do this examination.
   - Previous examinations were not completed.
     
     Was the applicant learning what to say or not say in order to pass?
   - Previous problems prevented certification (medical or mental health history).
   - Previous experience with health professionals was not adequately explained.
   - Pilot has had personal counselling by mental health professionals or paraprofessionals.
   - Pilot time is unusual or contains unexplained gaps.
     
     Ask for explanation from a high-time pilot with no date of last examination.
   - Medication history suggests significant illnesses that pilot did not note on the history questionnaire.
     
     Obtain an adequate history.
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

- Explanations for any medical history or findings do not make sense or seem illogical.

*Remember Jones’s Rule of Irrational Data*: If you don’t understand what a flier means, assume it’s your problem. Ask again, clearly. If the flier tries hard to explain, you try hard to understand, and you still don’t understand, it’s probably the flier’s problem. Find out what it is. Possibilities include simple misunderstandings, English as a second language, educational deficiencies, cultural differences, limited intelligence, neurological problems, or psychiatric problems.

3. Clues obtained during the physical examination:

- Note anything markedly different from what you usually see in pilots: trust your instincts.

- Assess the nature of the applicant's motivation to fly (Jones, 1986). Err on the side of caution.

*Watch for applicants who want to be fliers rather than who want to fly*. Some see themselves as alienated from others, or inept, or weak, and wish to acquire the attributes they perceive to be those of fliers: gregarious, competent, and strong.

*Watch for applicants who want to fly in order to prove fearlessness.*

*Watch for applicants whose only knowledge of flying is childish fantasy.*

- Look for scars without explanation obtained by history. Palpate scalp and skull for evidence of old head injury.

*Watch for applicants whose collection of scars reflects personal recklessness.*

- Watch for applicants who are evasive about surgical scars or head injury scars. Ask about significant loss of consciousness or amnesia if pilot did not report the injury on the 8500-8.

- Observe other pertinent physical factors bearing on mental status (e.g., dress, grooming conduct, alcohol on breath, needle tracks, tattoos that suggest sociopathy, slash scars on wrists, spider nevi, hepatomegaly, blood pressure, heart rate, pupils).

- Talk with applicants before, during, and after the physical examination—inquire about home, work, education, military, or flying. Trust your judgment if you feel uneasy.
Hints for Detecting Mental Health Problems During Routine
Periodic Physical Examinations

- Inquire about non-prescription medications, herbal remedies and dietary
  supplements.

  Such information may be aeromedically significant because of the nature of
  these remedies, or because of the symptoms for which the pilot feels they are
  necessary. Taking St. John’s Wort may indicate the presence of depressive
  symptoms, for instance.

4. What to do when you have finished:

- Ask enough questions to clarify troublesome issues.
- Obtain indicated medical data.
- If anything you encounter raises clinical questions about the applicant’s mental
  status, or even if you find yourself feeling uncomfortable without knowing exactly
  why, perform a brief mental status evaluation, using some or all of the items in
  the Formal Mental Status Examination (MSE) that follows.

  Note that some clinical MSEs, such as the Mini-Mental Status Examination,
  assess only the Sensorium rather than the entire mental status of a person.

- If you find anything that indicates clinical problems, consider necessary specialty
  consultations. Again, trust your judgment as an examiner, even if you can’t
  exactly define what’s wrong.
- Mention equivocal items in "Comments" section of Original or Renewal form for
  the record, even if you grant the certificate. Your data will be on record if the item
  arises in future examinations.
- If in doubt, call CASA AVMED for advice.
- If in serious doubt, defer; let CASA decide.
- As a last resort: make a “Don’t quote me” call to the medical authority.
AMSIT (Appearance, Mood, Sensorium, Intelligence, Thought) is adapted from a formulation by David Fuller, MD, as presented in R.L. Leon, MD. Psychiatric Interviewing: A Primer. Ed 2, New York; Elsevier/Science Publishing Co. 1989.

**Appearance, Behaviour, and Speech**

- **Physical Appearance**: apparent age, sex, and other identifying features. Appearance of being physically ill or in distress; and a careful description of the patient’s dress and behaviour.
- **Manner of Relating to Examiner**: placating, negativistic, seductive; motivation to work with examiner.
- **Psychomotor Activity**: increased or decreased, including jumpiness, jiggling, tapping, looking at watch, etc. Is the person hyperactive or lethargic?
- **Behavioural Evidence of Emotion**: tremulousness, perspiration, tears, clinched fist, turned-down mouth wrinkled brow, etc.
- **Disturbance of Attention**: distractibility, self-absorption.
- **Speech**: description—volume, rate (pressed or slowed), clarity, spontaneity and disturbances—mutism, word salad, perseveration, echolalia, affectation, neologisms, clang speech.

**Mood and Affect**

**Note**: “Mood is to Affect as Climate is to Weather.”

- **Mood**: use adjectives: *mild* (it’s there), *moderate* (it needs treatment), or *severe* (it needs treatment today!). Consider depression, elation, or other sustained emotions such as anger, fear, or anxiety.
- **Affect**: its range, intensity, lability, and appropriateness to immediate thought. To describe a normal, stable emotional status, say something like “The examinee’s mood is euthymic. Affect is unremarkable in range, intensity, and stability, and is appropriate to material being discussed.”

**Sensorium**

- **Orientation**: for time, place and situation.
- **Memory**: *immediate* (digits recall), *recent* (three items for 10 minutes, current events) and *remote* (history).
Formal Mental Status Examination

- **Calculating Ability**: serial 7’s, 11 times 13 out loud (valid only if patient is adequately educated).
- **Concentration**: spell WORLD backwards, then arrange its letters alphabetically. Repeat with EARTH.

**Intellectual Function**

Estimate current level of function as above average, average, or below average based on general fund of information, vocabulary, and complexity of concepts. Do not confuse intelligence with education. Can the examinee handle abstract ideas, reason by analogy, “make the connection” in conversation? Is the examinee about as smart as the examiner?

**Thought**

- **Coherence**: clear thoughts may be expressed incoherently.
- **Logic**: even clear, grammatical speech may express illogical thoughts.
- **Goal Directedness** (has a point and makes it): tangential or circumstantial thought.
- **Disturbance of Attention**: distractibility (interrupts own sentences), self-absorption.
- **Associations**: loose associations, blocking of obvious ideas or connections, flight of ideas.
- **Perceptions**: hallucinations (false perceptions), illusions, depersonalisation, distortion of body image.
- **Delusions**: false interpretations of real situations.
- **Other Content**: noteworthy memories, thoughts and feelings; suicidal or homicidal intent.
- **Judgement**: formal (specific set-piece situations such as “mailing a letter you find on the street”), social (how examinee behaves with examiner, how he or she “reads” other people—predictable, reasonable, comfortable).
- **Abstracting Ability**: ask pilot to define similarities/differences between tree-bush, child-midget, king-president, character-personality. This is more reliable than interpreting proverbs (stitch in time, bird in the hand).
- **Insight**: understanding of any personal dysfunction affecting self or others, and its need for treatment. Insight is lacking if there is an unacknowledged problem, superficial if it is only acknowledged (“It is a problem.”), moderate if it is personalized (“I have a problem”), and profound if “It’s my problem, and it’s up to me to fix it.”
1. Revision History
Before a diagnosis of ADD/ADHD can be made, the following criteria (from DSM IV) must be fulfilled:

A. Either (1) or (2):

1. Six (or more) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
   - Often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
   - Often has difficulty sustaining attention in tasks or play activities
   - Often does not seem to listen when spoken to directly
   - Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
   - Often has difficulty organizing tasks and activities
   - Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
   - Often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
   - Is often easily distracted by extraneous stimuli
   - Is often forgetful in daily activities.

2. Six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
   - Hyperactivity
     - Often fidgets with hands or feet or squirms in seat
     - Often leaves seat in classroom or in other situations in which remaining seated is expected
     - Often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
     - Often has difficulty playing or engaging in leisure activities quietly
     - Is often "on the go" or often acts as if "driven by a motor" often talks excessively
   - Impulsivity
     - Often blurts out answers before questions have been completed
     - Often has difficulty awaiting turn
     - Often interrupts or intrudes on others (e.g. butts into conversations or games)
Criteria for the Diagnosis of Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g. at school [or work] and at home).

D. Clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g. Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

Specify Types:

- **Attention-Deficit/Hyperactivity Disorder, Combined Type**: if both Criteria A1 and A2 are met for the past 6 months.

- **Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type**: if Criterion A1 is met but Criterion A2 is not met for the past 6 months.

- **Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type**: if Criterion A2 is met but Criterion A1 is not met for the past 6 months.
**Revision History**

*Note:* The Revision History shows the most recent amendment first. Scroll down the table to view details of previous amendment information.

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Application for Appointment or Re-appointment as
Designated Aviation Medical Examiner or
Designated Aviation Ophthalmologist
(Under Regulation 6.02 of the Civil Aviation Regulations)

Forward completed form and signed declaration to the Director of Aviation Medicine, GPO Box 1544, Canberra City, ACT 2601, Fax 02 62171640, e-mail avmed@casa.gov.au.

Tick as appropriate
- [ ] Designated Aviation Medical Examiner
  (Sign Declaration at page 3)
- [ ] Designated Aviation Ophthalmologist
  (Sign Declaration at page 5)

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The Federal Government TimeSaver initiative aims to assess the time taken to complete Government Forms. Please indicate the approximate time taken to complete this form. 

Hrs Mins
CONDITIONS OF APPOINTMENT

CASA DESIGNATED AVIATION MEDICAL EXAMINER (DAME)

1. Designation is for a period of four years unless earlier terminated, and is renewable.
2. Designation lapses if the aviation medical examiner ceases to practise in the locality for which he/she is designated.
3. Designation does not extend to the DAME’s partners, assistants or locums unless written consent from the CASA Director of Aviation Medicine/Principal Medical Officer is obtained in advance of the requirement.
4. The DAME is required:
   i. to conduct himself/herself in a professional manner and in accordance with the Australian Medical Association’s Code of Ethics (details of which are available from the Association’s web page www.ama.com.au);
   ii. to be satisfied as to the identity of each applicant;
   iii. to examine personally each application presenting for examination;
   iv. to devote such time and skill to the examination of applicants as is necessary to elicit a careful history and to conduct a full and thorough examination;
   v. at the conclusion of each medical examination to forward the report to CASA promptly;
   vi. if the holder of a medical certificate tells a DAME about a medical condition that is relevant to aviation safety, the DAME must inform CASA of the condition within 5 working days;
   vii. to keep informed of, and follow the relevant standards, techniques and administrative procedures associated with medical examinations detailed in The DAME Handbook and in the DAME Newsletter published by CASA on its website;
   viii. to undertake continuing training, acceptable to CASA, in Aviation Medicine;
   ix. to notify CASA if absent from active practice for more than 4 weeks;
   x. to notify CASA of any change of address, of contact details, or of cessation of practice;
   xi. on cessation of appointment as a DAME, to return the DAME stamp and to destroy or return any unused examination forms to CASA;
   xii. to acknowledge CASA’s right to terminate Designation should the DAME conduct himself/herself in a manner that is detrimental to the interests of CASA or breach any of these Conditions of Appointment;
   xiii. (Australian applicants only) to effect and maintain membership of the Australasian Society of Aviation Medicine (ASAM) or other approved aviation medical/scientific organization;
   xiv. to authorise CASA to publish in the DAME Newsletter and the CASA website the DAME’s cessation of practice, resignation of appointment as a DAME or termination of appointment as a DAME by CASA;
xv. to authorise the regulatory authority of any ICAO Contracting State that designated or
designates the DAME to disclose to CASA information about the DAME’s performance and
competence as a medical examiner; and

xvi. to authorise CASA to disclose to the regulatory authority of another ICAO Contracting State
that designates medical examiners for that State that has designated the DAME or to which the
DAME has applied to be designated, information about the DAME’s performance as a
medical examiner.

5. The DAME is required to provide the following facilities and equipment:

i. a suitable examination room and general diagnostic equipment, including an accurate
sphygmomanometer;

ii. simple urine testing facilities;

iii. Ishihara pseudoisochromatic chart (24 plate) for colour vision testing;

iv. visual acuity charts(s) for use at 6 metres;

v. N series test types for near vision testing;

vi. ophthalmoscope;

vii. a height measuring scale (cm);

viii. weighing scales (kg);

ix. an electrocardiograph machine which complies with the Australian Standard, or a reliable
local source for obtaining ECGs when required. (A specimen tracing on a normal subject
from this machine may be required); and

x. a suitable computer, document scanner, modem and software package for communication
with CASA. (Details will be notified from time to time).

Declaration by Applicant

I have read the Conditions of Appointment (‘the Conditions’) set out above and, if designated, I agree
to accept the Conditions. Upon my designation, this declaration shall constitute my acknowledgment
for the purposes of subparagraph 4 (xii) and respective authorisation for purposes of subparagraphs 4
(xv) and (xvi) of the Conditions.

Applicant’s Signature                                               Date ............................... / ............./ .......

Name………………………………………………………………………………… (Please use Block Capitals)
CONDITIONS OF APPOINTMENT

CASA DESIGNATED AVIATION OPHTHALMOLOGIST (DAO)

1. Designation is for a period of four years unless earlier terminated, and is renewable.
2. Designation lapses if the aviation medical examiner ceases to practise in the locality for which he/she is designated.
3. Designation does not extend to the DAO’s partners, assistants or locums unless written consent from the CASA Director of Aviation Medicine/Principal Medical Officer is obtained in advance of the requirement.
4. The DAO is required:
   i. to conduct himself/herself in a professional manner and in accordance with the Australian Medical Association’s Code of Ethics (details of which are available from the Association’s web page www.ama.com.au);
   ii. to be satisfied as to the identity of each applicant;
   iii. to examine personally each application presenting for examination;
   iv. to devote such time and skill to the examination of applicants as is necessary to elicit a careful history and to conduct a full and thorough ophthalmic examination;
   v. at the conclusion of each medical examination to forward the report to CASA promptly;
   vi. to keep informed of, and follow the relevant standards, techniques and administrative procedures associated with ophthalmological examinations detailed in The DAME Handbook and in the DAME Newsletter published by CASA on its website;
   vii. to notify CASA if absent from active practice for more than 4 weeks;
   viii. to notify CASA of any change of address, of contact details, or of cessation of practice;
   ix. on cessation of appointment as a DAO, to return the DAO stamp and to destroy or return any unused examination forms to CASA;
   x. to acknowledge CASA’s right to terminate Designation should the DAO conduct himself/herself in a manner that is detrimental to the interests of CASA or breach any of these Conditions of Appointment;
   xi. (Australian applicants only) to effect and maintain membership of the Australasian Society of Aviation Medicine (ASAM) or other approved aviation medical/scientific organization;
   xii. to authorise CASA to publish in the DAME Newsletter and the CASA website the DAO’s cessation of practice, resignation of appointment as a DAO or termination of appointment as a DAO by CASA;
   xiii. to authorise the regulatory authority of any ICAO Contracting State that designated or designates the DAO to disclose to CASA information about the DAO’s performance and competence as a medical examiner; and
xiv. to authorise CASA to disclose to the regulatory authority of another ICAO Contracting State that designates medical examiners for that State that has designated the DAO or to which the DAO has applied to be designated, information about the DAO’s performance as an ophthalmologist examiner.

**Declaration by Applicant**

I have read the Conditions of Appointment (‘the Conditions’) set out above and, if designated, I agree to accept the Conditions. Upon my designation, this declaration shall constitute my acknowledgment for the purposes of subparagraph 4 (x) and respective authorisation for purposes of subparagraphs 4 (xiii) and (xiv) of the Conditions.

Applicant’s Signature

Date ................................../ ........../ ............

Name...................................................................................(Please use Block Capitals)
Designated Aviation Medical Examiner’s Handbook

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You should always refer to the applicable provisions of the Civil Aviation Act, Civil Aviation Regulations and Civil Aviation Orders, rather than this manual, to ascertain the requirements of, and the obligations imposed by or under, the civil aviation legislation.

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Designated Aviation Medical Examiner's Handbook
1. Administrative Aspects
1.1 Introduction

1.1.1 Abbreviations Used in this Handbook.
- ARN: Aviation Reference Number
- AMSANZ: Aviation Medical Society of Australia and New Zealand
- ASAM: Australasian Society of Aerospace Medicine
- AsMA: Aerospace Medicine Association
- ATPL: Airline Transport Pilot Licence
- CAA: Civil Aviation Act
- CAR: Civil Aviation Regulations
- CASR: Civil Aviation Safety Regulations
- CASA: Civil Aviation Safety Authority (Australia)
- DAEE: Designated Aviation Eye Examiner
- DAME: Designated Aviation Medical Examiner
- DAO: Designated Aviation Ophthalmologist
- FAA: Federal Aviation Administration (US)
- IAASM: International Academy of Aviation and Space Medicine
- ICAO: International Civil Aviation Organization
- JAA: Joint Aviation Authorities (Europe)
- MRS Online: Medical Records System Online
- PMO: Principal Medical Officer

1.1.2 The Origin and Development of the CASA DAME Handbook

CASA and its antecedent organizations have published advice for DAMEs concerning practical and administrative aspects of their duties for many years. The most comprehensive and semi-permanent repository of such advice has been CASA’s DAME Handbook, which originated in the late 1980s. The original hard copy publication was an amalgam of advice derived from many sources. Some of the material can be traced back to directives produced by the Aviation Medicine Branch within the Australian Department of Civil Aviation during the 1950s. A considerable debt is due also to earlier published advice from other Regulators, particularly CAA (New Zealand) and the US FAA.

The DAME Handbook was never intended to be completely prescriptive or authoritative, particularly in its more clinically oriented sections. The principal purpose of creating (and maintaining) such a publication is to provide a compact ready reference for DAMEs and anyone else in CASA’s procedures related to aeromedical certification. Soon after The DAME Handbook was first published, a need for further explanation and elaboration of its contents became obvious, leading to creation of periodic DAME Newsletters issued by the Director of Aviation Medicine. Jointly, these publications aspired to answer DAMEs’ FAQs and to provide guidance that would reduce errors and facilitate expeditious handling of the medical examinations and reports concerning applicants prepared for CASA.
By 1998, *The DAME Handbook* was showing distinct signs of nearing the end of its useful life. Parts of the *Handbook* had been so qualified and specifically interpreted that it was sometimes difficult for DAMEs and even for staff of CASA Aviation Medicine Section to understand all requirements. Thereafter, an interim revision was produced to remove the more glaring inconsistencies and contradictions that existed between it and some DAME Newsletters. At the same time, CASA had determined that all its future public documents should be created and maintained in electronic format, available on-line, rather than as hard copy. This decision had other major implications, particularly the accessibility of all such documents to unrestricted public scrutiny.

The first on-line version of *The DAME Handbook* was posted on CASA’s website in May 1999. It represented only an interim answer to a continuing need to provide succinct, accessible, relevant advice to DAMEs and other interested persons. At that stage, much of its contents still derived from the reverence accorded to our authoritative forebears, who had not been constrained to reach decisions on evidence-based medicine principles. At least the style was brought into line with modern CASA standards.

The next priority was to review the contents of the system-based chapters in Section 2. This task has continued ever since. CASA intends that this process will continue indefinitely, to ensure relevance and currency of guidance provided. CASA is committed to procedural transparency and to meeting best-practice standards in all of its activities. Aviation Medicine Section’s accelerating, continuous review of *The DAME Handbook* reflects that commitment and will result in the availability of a better, cross-referenced and more practically useful guide.

### 1.1.3 Appointment and Legal Status of Designated Aviation Medical Examiners (Target Audience of the Handbook)

In order to utilise a Flight Crew Licence or Air Traffic Service Licence, it is necessary to have a medical clearance at a standard appropriate to the licence held. Within Australia, designated medical practitioners perform the necessary medical examinations for the Aviation Medicine Section of the Civil Aviation Safety Authority.

Designated medical practitioners perform medical examinations to meet the provisions of the Civil Aviation Act, the Civil Aviation Regulations and the Civil Aviation Safety Regulations. The practitioners approved to perform these examinations are known as Designated Aviation Medical Examiners (DAMEs) or Designated Aviation Ophthalmologists (DAOs). They are responsible to the Principal Medical Officer, who oversees the administration of the DAME and DAO systems.

In order to meet CASA’s needs and the needs of applicants for medical certification, appropriately qualified holders of certain positions are also permitted to undertake the duties of DAMEs and DAOs.
In order to meet CASA’s needs and the needs of applicants who are distant from regular examiners for medical certification, appropriately qualified individual practitioners may also be permitted, as needed, to undertake the duties of DAMEs and DAOs.

Certain optometrists are also approved to perform all those examinations usually carried out by DAOs. These practitioners are known as Designated Aviation Eye Examiners (DAEEs).

To request appointment or reappointment as a DAME, DAO or DAEE, complete a CASA application form (Form 755). Intending applicants may wish first to obtain additional information from one of CASA’s DAME Liaison Officers.

### 1.1.4 Qualifications and Experience

1. Medical practitioners designated by CASA to perform Air Crew and Air Traffic Services medical examinations must be registered with the medical registration authority of the State or Territory of the Commonwealth or country in which they reside.

2. As a signatory to the Chicago Convention, Australia is bound to appoint as DAMEs only medical examiners that have had appropriate training in aviation medicine. Possession of the Australian Certificate in Civil Aviation Medicine or similar qualification is the normal minimum requirement for appointment as a DAME. A list of courses that CASA will routinely approve for this purpose is available on the CASA website. Applicants for appointment as DAMEs on the basis of completion of other courses should contact CASA’s DAME Liaison Officers to discuss requirements.

Prior to appointment, and periodically thereafter, DAMEs are required to give an undertaking to abide by specified conditions of appointment. This is contained in Form 755.

3. DAMEs are required to attend periodic training seminars or courses in aviation medicine approved by CASA. Routinely approved seminars or courses will be posted on the CASA website. Attendance at an aerospace medicine scientific meeting such as those conducted by ASAM (formerly AMSANZ), AsMA, IAASM, FAA, CASA or similar bodies is sufficient to meet this requirement. DAMEs may also apply individually for approval of other appropriate training activities. Documented attendance at an appropriate activity is usually required at least once every two years.

Because DAOs and DAEEs examine and report only on applicants’ vision, they are encouraged but not required to undertake appropriate training in aviation medicine. However, these practitioners are required to undertake continuing professional education approved by CASA. (CASA will accept evidence of completion of continuing professional education required by an appropriate professional college, association or registration authority as satisfying this requirement).
4. DAMEs resident in Australia are required to effect and maintain membership of the Aviation Medical Society of Australia and New Zealand/the Australasian Society of Aerospace Medicine.

5. DAOs and DAEEs resident in Australia are required to effect and maintain membership/associate membership, as appropriate, of the Aviation Medical Society of Australia and New Zealand/the Australasian Society of Aerospace Medicine.

6. All designated examiners should, as far as possible, be aware of the conditions in which applicants for medical certification are employed or operate. CASA encourages designated examiners to acquire practical experience of these conditions.

7. Designation is usually granted only to practitioners in full-time practice and for one address. Continued designation is subject to the terms set out in the application for appointment in Form 755.

1.1.5 Duration of Designation

CASA appoints DAMEs, DAOs and DAEEs for periods specified at the time of appointment. They are required to re-apply for appointment at the end of each such period.

Designation lapses if the designated examiner ceases to practise at the location for which he/she is appointed, unless CASA approves a changed practice location.

Designation lapses if the designated examiner fails to observe the relevant conditions of appointment as set out in Form 755.

Designation does not automatically extend to a designated examiner’s partners, assistants, locums or successors without prior CASA approval, which should be sought well in advance of any anticipated need. Designated examiners who wish to have other practitioners act in their stead should contact CASA to ascertain precise requirements. For DAMEs’ proposed locums, completion of an approved aviation medicine course is a prerequisite for approval. CASA does not usually approve locum appointments for periods of less than four weeks.
1.1.6 Duties and responsibilities of DAMEs

1. On becoming aware of any condition of potential aeromedical significance in the holder of or applicant for an aviation medical certificate, the DAME must notify CASA of full details within five working days. Note that certain minor conditions (see 1.4.5 Temporary Incapacity of Certificate Holders) need not be reported until the applicant’s next-following routine medical assessment. CASR 67.125 refers.

2. The DAME must be satisfied as to the identity of each applicant for medical certification. Unless the DAME personally knows the applicant, he/she must sight a photographic identity document of the applicant. Subsequently, the DAME is required to certify that he/she has formally identified each applicant. CASR 67.170 refers.

Note: It is prudent to remind applicants, when making appointments, of the need to bring photographic identification to their appointments.

3. The DAME is to answer the medical history questions in the medical assessment report, in conjunction with the applicant, and ensure that the applicant understands each such question.

4. The DAME is to examine personally each applicant presenting for examination, and record the results in the medical assessment report.

5. The DAME is to perform or arrange for any investigations or specialist assessments that are necessary for the examiner to be satisfied that the applicant meets the medical standard for the class of medical certificate sought. See Examiners With Farnsworth Lantern Testing Facilities on the CASA website.

6. The DAME is to comply with CASA’s directions concerning completion and lodgement of medical reports.

7. The DAME is to forward to CASA each medical report or ancillary report received concerning an applicant for medical certification. In usual circumstances, all such reports should be dispatched within 14 days of receipt unless the DAME has contacted CASA and a different schedule has been agreed.

8. The DAME is to ensure that the applicant signs the required statement on completion of the examination. Thereafter, the DAME is to complete his/her details on the statement, and forward it to CASA within the specified period. Under no circumstances should the statement be given to the applicant to dispatch to CASA.
9. The DAME is to maintain an up-to-date knowledge of the relevant civil aviation medical standards and techniques required by CASA and by ICAO, and also interpret these requirements for applicants for medical certification. In particular, the DAME is to acknowledge promptly advice from CASA on publication of DAME Newsletters or of changes to the DAME Handbook.

10. The DAME is to notify CASA promptly of any change of address, change of e-mail address, change of telephone number, or absence from practice for periods of four weeks or more.

11. The DAME is to display his/her certificate of appointment as a DAME in his or her professional rooms.

12. The DAME is to return his/her official stamp to CASA on cessation of appointment.

13. The DAME is to use his/her official stamp only for CASA-related purposes. In particular, it should not be used as a means of certifying completion of any medical examinations not required by CASA.

14. CASA requests that DAMEs inform the Authority of details when they learn of the death of any medical certificate holder. (Although this is not a requirement of appointment, such notice is useful for CASA’s monitoring of the health of Australia’s aviation workforce.)

1.1.7 Duties and Responsibilities of DAOs and DAEEs

CASR 67.125
1. On becoming aware of any condition of potential aeromedical significance in the holder of or applicant for an aviation medical certificate, the DAO or DAEE must notify CASA of full details within five working days. Note that certain minor conditions need not be reported until the applicant’s next-following routine medical assessment (see 1.4.5 Temporary Incapacity of Certificate Holders). CASR 67.125 refers.

CASR 67.170
2. The DAO or DAEE must be satisfied as to the identity of each applicant for medical certification. Unless the DAME or DAEE personally knows the applicant, he/she must sight a photographic identity document of the applicant. Subsequently, the DAO or DAEE is required to certify that he/she has formally identified each applicant. CASR 67.170 refers.

Note: It is prudent to remind applicants, when making appointments, of the need to bring photographic identification to their appointments.

3. The DAO or DAEE is to examine personally each applicant presenting for examination, and record the results in the eye examination report.
4. The DAO or DAEE is to comply with CASA’s directions concerning completion and lodgement of eye examination reports. See *Examiners With Farnsworth Lantern Testing Facilities* on the CASA website.

5. The DAO or DAEE is to ensure that the applicant signs the **required statement** on completion of the examination, enter his/her details on the statement, and forward it to CASA within the period specified.

6. The DAO or DAEE is to maintain an up-to-date knowledge of the relevant civil aviation medical standards and techniques required by CASA and by ICAO, and also interpret these requirements for applicants for medical certification. In particular, the DAO or DAEE is to acknowledge promptly advice from CASA on publication of DAME Newsletters or of changes to the DAME Handbook.

7. The DAO or DAEE is to notify CASA promptly of any change of address, change of e-mail address, change of telephone number, or absence from practice for periods of four weeks or more.

8. The DAO or DAEE is required to display his/her certificate of appointment as a DAO or DAEE in his or her professional rooms.

9. The DAO or DAEE is to return his/her official stamp to CASA on cessation of appointment.

10. The DAO or DAEE is to use his/her official stamp for CASA-related purposes only.

### 1.1.8 Facilities and Equipment

DAMEs are required to provide the facilities and equipment as set out in Form 755 under *Conditions of Appointment* of DAMEs – paragraph 5.

DAOs and DAEEs are required to provide appropriate facilities and equipment for eye examinations as required by CASA.

### 1.1.9 Powers under the Civil Aviation Regulations

The Civil Aviation Safety Regulations confer the following powers on DAMEs:

- Extension of the period in force of a current medical certificate, unless it bears the condition ‘Renew by CASA only’. Refer CASR 67.210.
1. Administrative Aspects

1.1 Introduction

1.1.10 Responsibilities Under the Civil Aviation Regulations

The Civil Aviation Safety Regulations confer the following responsibilities on DAMEs:

- To comply with any applicable requirements contained in the DAME Handbook.
- To observe of the Code of Ethics of the Australian Medical Association.
- To attend appropriate continuing education activities relevant to their aviation medicine practice.
- To report to CASA within five working days any safety-relevant condition detected in an applicant.
- To complete and promptly forward to CASA a Notice/Declaration/Consent/Authorisation: Medical Certification of Applicants form in respect of each applicant examined. Note that part of this process requires the DAME to certify the identity of the applicant.

Further details appear in CASRs 67.060 and 67.170.

The Civil Aviation Safety Regulations confer the following responsibilities on DAOs and DAEEs:

- To comply with any applicable requirements contained in the DAME Handbook.
- To observe of the Code of Ethics of the Australian Medical Association or the Optometrists’ Association Australia, as appropriate.
- To report to CASA within 5 working days any safety-relevant condition detected in an applicant.
Further details appear in CASRs 67.080 and 67.170.

When CASA (or a DAME, DAO or DAEE) refers an applicant to a specified medical specialist of its / the referring practitioner’s choice for investigation and / or report, CASA expects that the medical specialist concerned will observe an appropriate, ethical level of professional impartiality. Supreme Court of the ACT Practice Direction No 3 of 2002 (and similar court directives issued in other Australian jurisdictions) provides relevant guidance. If in doubt as to requirements, referring professionals are invited to contact CASA Aviation Medicine Section to discuss the matter.

### 1.1.11 Protection Under the Civil Aviation Regulations

CASA 67.140

Civil Aviation Safety Regulations provide complete indemnification against civil or criminal liability for any medical practitioner or other nominated person or organisation that, in good faith, performs an indemnified act in accordance with the Regulations. Refer CASR 67.140.

For this purpose, ‘an indemnified act’ means any act whereby a DAME, other medical practitioner or other specified person (including a DAEE) advises CASA of any concerns over the ability of a medical certificate holder or applicant to meet a required medical standard for such certification. CASA requires such advice to be provided in writing.

### 1.1.12 Fees

CASA does not set or recommend fees for general DAME, DAO or DAEE examinations.

In the case of CASA employees who are required to hold aviation licences to perform their duties and are thus entitled to reimbursement from CASA for the cost of examinations and any related tests, CASA will reimburse fees determined as reasonable by the CASA PMO. In general, CASA will accept as reasonable, fees that closely approximate the fees recommended in the current edition of the *AMA List of Medical Services & Fees*. Any additional amounts will be the responsibility of the examinee. In cases of doubt or unusual complexity, examiners are invited to discuss the matter with the CASA PMO. Note that CASA will not accept responsibility for any treatment expenses incurred by its employees arising from findings in the course of routine assessments for medical certification.

When presenting for assessment, CASA employees should either present a CASA claim for payment form, with details of where to send it to obtain payment, or personally pay for the consultation and claim reimbursement from CASA. Examiners should not send accounts to Aviation Medicine Section unless this has been previously agreed as the result of a specific request from Aviation Medicine Section.
Where a DAME has been required to expend additional time and effort for a CASA employee in arranging specialist referrals or investigations, obtaining and interpreting copies of reports, or on similar activities, an approach to the CASA PMO for a higher-than-normal fee may be considered.

Additional Examinations

Where additional consultations or investigations are necessary to ascertain if an applicant for medical certification meets the required medical standard, the applicant is usually responsible for meeting any costs involved. If such tests are undertaken principally for screening purposes, they will not generally be eligible for rebate from the Health Insurance Commission (HIC). However, if additional tests are required to elucidate a health problem for which medical opinion, investigation or treatment is clinically necessary, these should be rebatable. Affected applicants should be advised to discuss their individual cases with the HIC.

In the case of CASA employees who are required to hold aviation licences to perform their duties and are thus entitled to reimbursement from CASA for the cost of examinations and any related tests, CASA will reimburse fees determined as reasonable by the CASA PMO for additional consultations or investigations necessary to ascertain if the employee meets the required medical standard. In general, CASA will accept as reasonable, fees that closely approximate the fees recommended in the current edition of the *AMA List of Medical Services & Fees*. Any additional amounts will be the responsibility of the examinee. Note that CASA will not accept responsibility for any treatment expenses incurred by its employees arising from findings in the course of routine assessments for medical certification.
1.2.1 Licences – General

Aircrew and air traffic services licences are issued to applicants who have met the relevant technical and theoretical standards. Once a licence is issued, it continues in effect indefinitely. A valid medical certificate appropriate for the class of licence must accompany the licence for the licence holder legally to exercise the privileges of the licence.

1.2.2 Classes of Medical Certificates for Licence Types

There are three medical standards relating to the various types of licences held. These three standards relate to Class 1, 2 and 3 Medical Certificates.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Applicable to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>All professional technical aircrew of powered aircraft, and is required for issue of Airline Transport Pilot Licence, Commercial Pilot Licence, Flight Engineer or Flight Navigator Licences.</td>
</tr>
<tr>
<td>Class 2</td>
<td>Student Pilot, Private Pilot, Commercial Pilot Balloons and Flight Radio Operator Licences.</td>
</tr>
<tr>
<td>Class 3</td>
<td>Air Traffic Control staff.</td>
</tr>
</tbody>
</table>

1.2.3 Duration of Validity

See 1.4.7 Special Periodic Examinations Required.

Unless otherwise advised by the Aviation Medicine Section:

- Class 1: Medical Certificate is valid for one year (but see 1.4.7 Special Periodic Examinations Required).
- Class 2: Medical Certificate is valid for four years, for applicants less than 40 years of age on the day of issue, and in all other cases for two years.
- Class 3: Medical Certificate is valid for two years.

Where an applicant’s medical condition is under review, the duration of Medical Certificate validity may be varied at the discretion of the Principal Medical Officer.
### 1.2.4 Special Reports and Tests Required for Medical Certification

<table>
<thead>
<tr>
<th>Class 1</th>
<th>Initial Issue</th>
<th>ECG, audiogram, estimation of fasting serum lipids and fasting blood glucose and an examination by CASA Designated Aviation Ophthalmologist.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Renewals</td>
<td>ECGs are required at the first renewal after the 25th, 30th, 32nd, 34th, 36th, 38th and 40th birthdays, and annually thereafter. Audiograms are required at the first renewal after the 25th birthday and every fifth birthday thereafter. Estimation of fasting serum lipids and of fasting blood glucose is required at the first renewal after the 25th birthday and every fifth birthday thereafter. Examination by CASA Designated Aviation Ophthalmologist at age 60 and at two-yearly intervals thereafter.</td>
</tr>
<tr>
<td>Class 2</td>
<td></td>
<td>Where an applicant for original medical certification has a visual acuity &lt; 6/60 in either eye, an ophthalmic report from an ophthalmologist or optometrist (preferably a DAO or DAEE) is required. There are no other special requirements, except where an examiner determines a clinical indication exists.</td>
</tr>
<tr>
<td>Class 3</td>
<td>Initial Issue</td>
<td>ECG, audiogram, estimation of fasting serum lipids and fasting blood glucose and an examination by CASA Designated Aviation Ophthalmologist.</td>
</tr>
<tr>
<td></td>
<td>Renewals</td>
<td>ECGs are required at the first renewal after the 25th and 30th birthdays and every two years thereafter, ie, at every subsequent routine examination. Audiograms are required at the first renewal after the 25th birthday and then at each renewal after every fifth successive birthday. Estimation of fasting serum lipids and of fasting blood glucose is required at the first renewal after the 25th birthday and then at each renewal after every fifth successive birthday. Examination by CASA Designated Aviation Ophthalmologist at age 60 and at two-yearly intervals thereafter.</td>
</tr>
</tbody>
</table>

See also section 1.4.1 Electrocardiographs.
1.3.1 General Matters

From 2003, CASA has adopted a medical assessing system intended to automate the process of medical certification to the greatest extent practicable. The technological platform for this process is a computer-based system known as the CASA Medical Records System Online (MRS Online). Intended future development of MRS Online will further improve the speed and accuracy of medical certification.

Once MRS Online became fully operational, CASA decommissioned the former paper-based medical reporting system, which relied on optical scanning to capture and store data from routine medical assessments. CASA no longer maintains a capability to process paper-based routine reports of medical assessments. Consequently, any paper-based medical examination and report forms received are returned to the originator and a notice sent to the examinee advising him/her that the medical report has not been processed and that another is required. Note that further exercise of licence privileges is not permitted until medical certification via MRS Online is complete.

Pending further development of MRS Online, hard copies of applicant statement and examiner certification forms are still required.

CASA continues to accept hard copies of other medical reports, particularly ECGs, because of the time taken to transmit such documents electronically from some computer servers. However, CASA’s preference is for such documents to be scanned and transmitted electronically as attachments to the medical assessment form. In the near future, this will become the only available means for their lodgement.

If, for any reason, an examiner is unable to transmit a medical assessment form to CASA electronically, it is temporarily possible for an examination form to be mailed to the examiner on diskette. Once completed, the diskette can be returned and CASA can then load it manually into MRS Online. CASA does not intend to support this option in the long term because it vitiates many of the efficiency benefits available from MRS Online.

1.3.2 Medical and Ophthalmological Assessment Forms

Prior to undertaking any aeromedical examination, the examiner is to inform each applicant of the possible legal consequences of a deliberate false statement made with the intention of obtaining a medical certificate (see CASR 67). Thereafter, the examiner should obtain the applicant’s signature and complete the applicant statement and examiner certification form and record all relevant historical details obtained from the applicant.
CASA requires that the DAME personally ask the applicant the questions in the medical history section of the medical assessment report, then personally record the answers given. This allows the DAME to assess the applicant’s understanding of the questions and to provide any necessary explanations.

CASA similarly requires that the DAO/DAEE personally ask the applicant the questions in the medical history section of the eye assessment report, and personally record the answers given. This allows the DAO/DAEE to assess the applicant’s understanding of the questions and to provide any necessary explanations.

Slightly different historical data are required from applicants for original medical certification, where fuller details are sought, and from applicants for renewal medical certification. MRS Online automatically generates the appropriate questionnaire for each examination on the basis of its own records and/or input data.

MRS Online automatically generates an original medical history questionnaire whenever a period of 5 years or longer has passed since the applicant’s last medical assessment report.

Where the holder of an existing class 2 medical certificate applies for medical certification at class 1 or 3 level, MRS Online will automatically generate an original medical history questionnaire.

### 1.3.3 The Medical Certificate

Civil Aviation Safety Regulations require an aviation licence holder to have a current, valid medical certificate appropriate to the class of licence held in order to validate the licence holder’s exercise of privileges conferred by the licence. That is, in order to exercise the privileges of an aviation licence, the licence holder must have both a licence and a valid medical certificate for the class of licence.

The medical certificate confirms that the applicant has been medically assessed, details the class of medical certificate held, the validity date, and confirms either that the required medical standard is met or details of any restrictions imposed by CASA which affect the medical certificate’s validity and therefore the use of the licence (refer 1.5.2 Frequently Used Conditions Endorsed on Medical Certificates). For professional licence holders, it also notes the dates of most recent additional examinations required (refer 1.4.6 Additional Investigations and Specialist Opinions).
DAMEs are not authorised to issue interim original medical certificates. Where permitted by Civil Aviation Safety Regulations (see CASR 67.220 and 67.225) they may revalidate an existing current medical certificate or one that has expired for less than three months (see following Section). Legally, every medical certificate is a new medical certificate. The ‘new’ medical certificates issued by DAMEs under provisions of CASR 67.225 actually refer to revalidated medical certificates that have expired for less than three months.
1.3.4 Medical Certificate Revalidation

DAMEs are not permitted to revalidate medical certificates endorsed ‘Renew by CASA only’. Affected applicants are encouraged to return to the DAME for early review, leaving adequate time for CASA to receive the periodic medical assessment and any other required reports and to make a determination on fitness for renewed medical certification.
On completion of the medical assessment, provided that the applicant appears to meet the required medical standard and provided the medical certificate has not been endorsed ‘Renew by CASA only’, the DAME may revalidate an applicant’s medical certificate only, as follows (refer CASR 67.220):

- If the applicant’s medical certificate has not expired and the assessment is conducted more than 28 days before the expiry date shown on the certificate—for up to two calendar months from the date of the assessment. (But see ‘Exception for ATPL recertification’ below).

- If the applicant’s medical certificate has not expired and the assessment is conducted within 28 days preceding the expiry date shown on the certificate—for up to two calendar months beyond the expiry date shown on the certificate.

- If the applicant’s medical certificate has expired, and the assessment is conducted within three calendar months of the expiry date shown on the certificate—for up to two calendar months from the date of the assessment.

To revalidate the medical certificate, the following endorsement is required:

‘Examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (the appropriate date to be inserted is determined according to instructions in the preceding paragraph):

DAME’s signature, date, DAME stamp.

**Note:** Any specialist assessments required in connection with a medical certificate renewal examination need not be performed within 28 days preceding the medical certificate’s expiry date. Guidance on CASA’s usual approach to currency of specialist reports and other investigations appears under 1.8 Frequently Asked Questions.

**Exception for ATPL recertification.**

Some CASA medical standards differ from those required by ICAO (refer Section 2.15). In particular, ATPL holders aged over 40 but under 60 may receive Australian class1 medical certification for 12 months, while ICAO countenances only six months. Because many of this group operate on international routes, CASA advises (and airlines require) that their medical certification is ICAO compliant.
Such applicants will often return for reassessment within the first 6 months of a medical certificate, which is valid for 12 months. In this circumstance, the DAME should endorse the applicant’s medical certificate as follows.

‘Re-examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (this will usually be the date 2 months after the assessment date)
signature, date, DAME stamp

Subsequently, in the usual course of events, CASA will issue a new class 1 medical certificate valid for a further 12 months from the date of assessment. Alternatively, CASA may issue a new medical certificate that has the effect of extending validity for six months longer than the current certificate’s expiry date. This situation will persist while ever the medical certificate holder operates as an ATPL in international air space.

Note: There are a number of other differences between CASA and ICAO medical standards. These particularly concern the periods of validity for medical certificates and the frequency of certain routinely required investigations or examinations. Full details likely to be of relevance to Australian examiners will be notified from time to time in DAME Newsletters. Those currently of interest are shown in section 2.15 of this manual. For practical purposes, only medical certificate holders who intend to exercise the privileges of licensure in other ICAO contracting states will be affected by these differences.

1.3.5 Assessments Other than Pass Assessments

Only CASA’s Principal Medical Officer (PMO) has the delegated power to cancel an applicant’s medical certificate(s).

Only CASA’s PMO and other CASA medical staff have the delegated power to suspend an applicant’s medical certificate(s).

A DAME may only revalidate the medical certificate of an applicant who appears to meet the required medical standard and where the medical certificate does not bear the endorsement ‘Renew by CASA only’. If a DAME has any concerns about an applicant meeting the required medical standard, he/she must decline to revalidate the medical certificate and refer the matter to CASA for determination. Relevant specialist opinions and/or investigations should be obtained and the results forwarded to CASA, together with the DAME’s opinion concerning the applicant’s fitness for certification.
To assist CASA’s consideration of applicants where there is doubt about ability to meet the required medical standard, DAMEs should avoid vague descriptive terms in their reports. Expressions such as ‘brief’, ‘infrequent’, ‘mild’, ‘some’ or similar convey no meaningful information. CASA recommends the “6W mnemonic”.

WHAT 1: What happened? (Detail signs and symptoms that led to the consultation, procedure performed etc).

WHAT 2: What were the sequelae?

WHEN: What were the dates and frequency?

WHERE: What body part was affected? (Left or right, upper arm/forearm etc).

WHY: Why was a procedure performed?

WHO: Who was involved? (Who carried out a procedure/made an assessment/is undertaking follow up, etc).

Once all necessary information has been received, CASA then submits full details of the case to a panel composed of aviation medicine practitioners. When appropriate, this panel may be supplemented by clinical or other specialists. A determination on the case will then be made and the applicant notified of the result.

If an applicant is dissatisfied with the panel’s determination, a review may be requested and/or the matter may be appealed to the Commonwealth Administrative Appeals Tribunal.

1.3.6 Identification of CASA Examiners (DAMEs, DAOs and DAEEs)

Each designated examiner (including approved locum examiners) requires an individual Aviation Reference Number (ARN), which must be obtained from CASA – refer Form1162.

CASA issues a unique identification stamp to each DAME. Each stamp carries a state or territory based code (‘A’ for ACT, ‘Q’ for Queensland etc, or ‘I’ for International) plus a three-digit number. Similarly, CASA issues a unique identification stamp to each DAO or DAEE. These also carry an alphanumeric code designating the state or territory plus a restriction limiting examinations to applicants’ eyes (‘SE’ for South Australia, ‘VE’ for Victoria, ‘IE’ for International, etc). Each stamp is intended for the exclusive use of the individual examiner to whom it is issued and, except as provided hereafter, must not be loaned to or used by any other practitioner without prior approval by the CASA PMO.

When CASA has approved a locum to act for a DAME, DAO or DAEE, the locum is to use the appropriate principal examiner’s stamp and also identify himself/herself as a locum in accordance with CASA procedures.
Locums

Locum approval must be obtained in writing from CASA prior to the dates requested. CASA requires a written request including the requested date, the contact details and signature of the proposed locum and the CV of the proposed locum. Once locum approval is gained in writing, the locum is able to perform aviation medical examinations and/or ophthalmological examinations using the existing stamp and writing ‘locum’ next to the stamp within the requested dates.

Locums are viewed the same as DAMEs and DAOs in terms of indemnification, rights and responsibilities. Locums are required to abide by the Conditions of Appointment.

CASA also issues DAME stamps to occupants of certain identified positions who otherwise meet the requirements for appointment as DAMEs (refer CASR 67). These are senior medical positions in the Australian Defence Force (ADF) or Royal Flying Doctor Service (RFDS). Whenever an approved ADF or RFDS medical officer performs a medical assessment under the auspices of one of these identification stamps, details of the individual examiner are also required. Thus it is only possible for ADF or RFDS medical staff who have registered with CASA to perform medical assessments under the auspices of one of these stamps.

The DAME/DAO/DAEE stamp plus the examiner’s ARN must be inserted on all applicant consent and examiner certification forms before their dispatch to CASA, together with signatures of the applicant and of the examiner.

Examiners’ identification stamps should be stored securely when not in use. The unique identification number on each stamp should be used in all correspondence between the examiner and CASA.
1.4.1 Electrocardiographs

Routine electrocardiographs are required at specified intervals for class 1 and class 3 medical certification. They may also be required on clinical grounds (see Section 2.2).

All ECGs sent to CASA are to be mounted on A4 paper and must contain the following information.

- Applicant’s full name
- Applicant’s ARN
- Date of recording.

Leads should be marked on the trace and the calibration mark should be clearly visible. The tracing should be performed using standard calibration (10 mm/mV). If half calibration is needed to clarify the standard trace, both should be sent to CASA. ECGs with slurred or incorrect calibration are not acceptable.

When self-reporting ECG machines are used, the reports are to be included with the tracings.

Where an ECG is known to be abnormal, copies of the previous ECG or reference to it (particularly regarding any changes) would be helpful and should speed CASA’s evaluation of the applicant.

Note that reports (whether by the DAME or other interpreter) should accompany all ECGs sent to CASA. Except for those already reported on by an approved specialist or interpreted by a self-reporting machine, CASA will arrange for a cardiologist to report on all ECGs. This process requires up to a week.

In future, CASA anticipates enabling on-line submission of ECGs via enhanced MRS Online. By then, CASA will likely require that all ECGs are reported on by a self-reporting machine, or interpreted and reported on by a cardiologist, physician or other specialist approved by CASA.

The DAME should also examine all ECGs and assess them as normal or abnormal, then provide details of any abnormality detected in the medical report.

Original issue ECGs performed for class 1 and class 3 applicants should be dispatched to CASA immediately following the examination. The DAME should read, assess and retain any future ECGs performed, except:

- At the first renewal after a class 1 or class 3 applicant’s 25th birthday and at designated intervals thereafter (refer to 1.4.7 ‘Special periodic Medical Examinations Required’), when copies are required for the applicant’s medical record maintained by CASA; and
- Any abnormal ECG must be sent to CASA, together with a cardiologist’s or other specialist’s report as appropriate.
1.4.2 Audiograms

The pure-tone audiogram performed by a DAME or any other person is treated by the Aviation Medicine Section as a screening test only, and is never used as the final arbiter of an applicant's ability to meet the hearing requirements for a Medical Certificate. Audiograms performed by DAMEs are acceptable. However, any audiometer used for CASA-required audiograms must have been calibrated within two years of the date of such examinations.

The audiogram result is to be stated in the medical assessment form even when a printed results slip is included with the form when lodged.

DAMEs should enclose the audiogram result printout with the medical assessment forms for all original Class 1 and Class 3 applicants.

1.4.3 Special Hearing Tests

Where a supplementary speech test is required, this can only be performed by AHS as the calibrated tapes and other equipment required are not available elsewhere. If the applicant fails the speech-based hearing test, in some cases an in-flight test may be offered if he/she has a high level of aeronautical experience. Such an operational check will involve evaluation of relevant aspects of the applicant's hearing by a CASA Flying Operations Inspector or an Authorised Testing Officer with test material transmitted from a control tower. Ideally the test should be conducted in the class of aircraft that is the same as that which the applicant normally operates.

Further information is available from CASA Aviation Medicine Section.

1.4.4 Assessment by Designated Aviation Ophthalmologists or Designated Aviation Eye Examiners

An applicant for original class 1 or class 3 medical certification requires routine assessment and reporting by a DAO or DAEE.

A class 1 applicant who has attained the age of 60 years requires further routine assessment and reporting by a DAO or DAEE. Further assessments are required at intervals of every two years thereafter (refer Section 1.4.7 'Special periodic medical examinations required').

Any applicant for original medical certification who fails to meet the required visual standard also requires assessment and reporting by an ophthalmologist or optometrist, usually a DAO or DAEE. CASA will determine subsequent requirements on a case-by-case basis.
Where a DAME detects or suspects ophthalmic pathology in any applicant for medical certification, referral to a DAO for further assessment is required.

A small number of experienced class 3 medical certificate holders have been ‘grandfathered’ so as to retain their medical certification, despite being unable to meet the colour vision requirements of the class 3 standard.

1.4.5 Temporary Incapacity of Certificate Holders

Refer CASR 67.265 and CASR 67.270.

CASA requires medical certificate holders who experience any medically significant changes in medical condition to inform CASA or a DAME of such changes.

The information is required to be conveyed to CASA or a DAME after the applicant has been aware of the change:

- For a class 1 medical certificate holder, for longer than 7 days
- For a class 2 medical certificate holder, for longer than 30 days
- For a class 3 medical certificate holder, for longer than 30 days.

Thereafter, the DAME so informed is required to notify CASA of the matter within 5 working days. Refer CASR 67.125.

A licence holder must not perform any act authorised by the licence while he or she has a medically significant condition which impairs his or her ability to do the act. Before resuming the exercise of privileges under the licence, the licence holder must obtain prior confirmation of fitness from a DAME, as follows:

- For a class 1 licence holder, where the medically significant condition has been present for longer than 7 days
- For a class 2 licence holder, where the medically significant condition has been present for longer than 30 days
- For a class 3 licence holder, where the medically significant condition has been present for longer than 30 days.
A DAME usually need not perform a full medical examination in these circumstances, but should satisfy himself/herself that the applicant has recovered from the illness, injury or other medically significant condition and meets the required medical standard for exercise of the privileges of any licence held. Therefore, a DAME should not issue a medical certificate of the ‘X will be fit for duty from some later date’ –type in anticipation of full recovery sufficient to meet the required medical standard.

Licence holders who fail to observe these requirements may be subject to heavy penalties, so DAMEs should take every opportunity to emphasise these legal requirements to them.

Certain trivial conditions in medical certificate holders need not be reported to CASA unless present at an applicant’s routine medical assessment. However, DAMEs are to advise applicants that these conditions must have resolved fully, without sequelae, prior to applicants resuming the exercise of privileges. Common examples include the following:

- Influenza, coryza, other URTI
- Cough in the absence of wheezing
- Sinusitis
- Occasional, mild headaches
- Uncomplicated urinary tract infection
- Gastroenteritis
- Uncomplicated haemorrhoid(s) if not bleeding and requiring only symptomatic treatment
- Mild allergic rhinitis, if no nasal blockage present and no antihistamine treatment required
- Minor soft tissue injuries without residual pain
- Muscular pain of short duration not requiring long-term medication and not related to any significant underlying chronic illness
- Dysmenorrhoea not requiring medication or absence from work
- Treated chronic fungal nail infections
- Dental extractions.

### 1.4.6 Additional Investigations and Specialist Opinions

The DAME should refer an applicant (or arrange referral through the applicant’s usual general practitioner) for appropriate specialist review(s) and/or other investigations whenever a significant abnormality in the history or physical examination of an applicant is detected. The purpose of such review or investigation is to clarify whether the applicant meets the required standard(s) for medical certification, or whether medical certification with appropriate conditions is compatible with the safety of air navigation.
Once the DAME has collated all relevant investigations and reports concerning the applicant, these should be sent to CASA, together with the DAME’s own assessment of whether the applicant meets the required standard(s) for medical certification, or whether medical certification with appropriate conditions is compatible with the safety of air navigation.

Where an applicant fails to return for follow up or completion of the assessment is delayed for more than one month for any reason, the DAME should forward to CASA advice of the situation and copies of any reports available. Thereafter, in the event of further delays, or of the applicant failing to return for review, the DAME should advise CASA as then appropriate. Written, faxed or e-mailed advice is required in these circumstances.

**Note:** MRS online will automatically capture incomplete medical examinations and highlight them for CASA’s attention 14 days after the examination has begun. CASA may then contact the DAME for an explanation of the circumstances surrounding the delayed completion of the assessment.
### 1.4.7 Special Periodic Examinations Required

<table>
<thead>
<tr>
<th>Certificate</th>
<th>Frequency</th>
<th>Requirements on Initial Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1 ATPL</td>
<td>12-monthly until age 60, then 6-monthly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
<tr>
<td>Class 1 CPL</td>
<td>12-monthly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
<tr>
<td>Class 2</td>
<td>Four-yearly until age 40, then two-yearly</td>
<td>FEV₁</td>
</tr>
<tr>
<td>Class 3</td>
<td>Two-yearly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
</tbody>
</table>

Examinations are as follows:

<table>
<thead>
<tr>
<th>Test</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio</td>
<td>Hearing test — audiogram</td>
</tr>
<tr>
<td>Eye</td>
<td>Specialist eye examination</td>
</tr>
<tr>
<td>ECG</td>
<td>Electrocardiogram</td>
</tr>
<tr>
<td>Serum Lipids</td>
<td>Total Cholesterol (fasting), HDL and LDL fractions</td>
</tr>
<tr>
<td>Blood Glucose</td>
<td>Blood Glucose (fasting)</td>
</tr>
<tr>
<td>Stress ECG</td>
<td>Exercise ECG on Bruce Protocol (no requirement for cardiologist referral)</td>
</tr>
<tr>
<td>FEV₁</td>
<td>Peak Flow (range is within 30% of the predicted value for height, sex and age – refer chart Peak Expiratory Flow in Normal Subjects)</td>
</tr>
</tbody>
</table>

### Notes:

1. All ECGs performed in connection with medical examinations marked with an asterisk (*) in the ‘Age’ column in the Class 1 and 3 table below are to be forwarded to the Aviation Medicine Section.

2. All abnormal ECGs are to be forwarded to the Aviation Medicine Section with medical assessment forms.

3. Each applicant for a class 1 or class 3 medical certificate who scores 15 or more points on the American Heart Association Coronary Heart Disease Prediction Chart must undergo a stress ECG in accordance with the instructions at Section 2.2.6.
(Notes: Contd)

4 Each applicant for a class 1 or class 3 medical certificate should have his/her risk score calculated at the original medical examination, then at the first medical examination after age 25, thereafter every 5 years until age 60, thereafter annually.

5 Fasting serum lipid estimations must include total cholesterol, high and low density lipoprotein cholesterol fractions: be certain to specify this on the pathology request form as an ‘Occupational Requirement’. (This alerts the pathology laboratory that the investigation is not HIC rebatable and usually ensures it will be performed, even when other lipid values are within normal limits).

6 On occasions, applicants may have undergone certain of these tests or specialist reviews independently of the CASA requirement. CASA will accept certified true copies of recent results (only). Guidance on acceptable recency is contained in Section 1.8, Frequently Asked Questions.
Classes 1 and 3 Additional Requirements

The table below gives the additional tests/examinations that are required at each renewal examination for applicants for Class 1 and 3 Medical Certificates. Requirements for applicants aged more than 80 years will be advised individually.

<table>
<thead>
<tr>
<th>Age</th>
<th>Tests/Examinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>25*</td>
<td>Audio Serum Lipids and Blood Glucose  ECG</td>
</tr>
<tr>
<td>30*</td>
<td>Audio Serum Lipids and Blood Glucose  ECG</td>
</tr>
<tr>
<td>32</td>
<td>ECG</td>
</tr>
<tr>
<td>34</td>
<td>ECG</td>
</tr>
<tr>
<td>35</td>
<td>Audio Serum Lipids and Blood Glucose  ECG</td>
</tr>
<tr>
<td>36*</td>
<td>ECG</td>
</tr>
<tr>
<td>38</td>
<td>ECG</td>
</tr>
<tr>
<td>40*</td>
<td>Audio Serum Lipids and Blood Glucose  ECG</td>
</tr>
<tr>
<td>45*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>50*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>55*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>60*</td>
<td>Audio Serum Lipids and Blood Glucose  Eye</td>
</tr>
<tr>
<td>62*</td>
<td>Eye</td>
</tr>
<tr>
<td>64*</td>
<td>Eye</td>
</tr>
<tr>
<td>65*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>66*</td>
<td>Eye</td>
</tr>
<tr>
<td>68*</td>
<td>Eye</td>
</tr>
<tr>
<td>70*</td>
<td>Audio Serum Lipids and Blood Glucose  Eye</td>
</tr>
<tr>
<td>72*</td>
<td>Eye</td>
</tr>
<tr>
<td>74*</td>
<td>Eye</td>
</tr>
<tr>
<td>75*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>76*</td>
<td>Eye</td>
</tr>
<tr>
<td>78</td>
<td>Eye</td>
</tr>
<tr>
<td>80</td>
<td>Audio Serum Lipids and Blood Glucose  Eye</td>
</tr>
<tr>
<td>&gt; 80</td>
<td>Requirements advised individually.</td>
</tr>
</tbody>
</table>
Legend

Audio  Hearing test—audiogram
Eye    Specialist eye examination
ECG    Electrocardiogram

Notes:
1 All ECGs performed in the course of medical examinations marked with an asterisk (*) in this table are to be sent to the Aviation Medicine Section.
2 All ECGs interpreted or reported as abnormal are to be sent to the Aviation Medicine Section.

1.4.8 Other Special Examinations

Applicants for class 1 or class 2 medical certification who fail the Ishihara Pseudoisochromatic Plates (PIP) colour vision test are to be referred to a centre that conducts Farnsworth Lantern (FALANT) testing. Applicants for class 1 or class 2 medical certification who fail the Farnsworth Lantern tests are to be referred for practical signal light testing. Contact CASA Aviation Medical Section on 131 757 (toll free) or 02 6217 1641 (direct), for details of how to arrange this testing. Note that colour vision testing for these applicants is to follow the sequence PIP → FALANT → practical signal light testing. A pass on any of these tests will satisfy the requirements for issue of an unrestricted class 1 or class 2 medical certificate.

New applicants for class 3 medical certification are required to pass the Ishihara PIP colour vision test. No additional or alternative colour vision testing is available for this group. A small number of experienced class 3 medical certificate holders have been ‘grandfathered’ so as to retain their medical certification, despite being unable to meet the colour vision requirements of the class 3 standard.

For certain applicants, routine periodic urinalysis for drugs is a requirement of continued medical certification. It is medicolegally essential that such testing be performed in accordance with a specified protocol. This protocol will be notified in due course.
1.5.1 General

 Whenever appropriate, CASA places a condition or conditions of use on an applicant’s medical certificate(s) which influences the validity of the medical certificate(s). Multiple conditions may be placed on a medical certificate, and different conditions may be placed on different classes of medical certificate held by an individual.

1.5.2 Frequently Used Conditions Endorsed on Medical Certificates

<table>
<thead>
<tr>
<th>Endorsement</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renew by CASA only.</td>
<td>The DAME may not revalidate the medical certificate. Any revalidation or renewal is the prerogative of CASA Medical staff</td>
</tr>
<tr>
<td>Visual correction required.</td>
<td>Applicant requires visual correction in order to meet the visual standard. Appropriate correction must be worn when exercising the privileges of the licence. (Class 3 certificates only).</td>
</tr>
<tr>
<td>Assured Visual Correction Required</td>
<td>Applicant requires visual correction in order to meet the visual standard. Appropriate correction must be worn and a spare pair of prescription spectacles must be carried/readily available when exercising the privileges of the licence.</td>
</tr>
<tr>
<td>Near Vision Correction</td>
<td>Applicant requires visual correction in order to meet the near vision standard. Appropriate correction must be readily available and a spare pair of prescription spectacles carried/readily available when exercising the privileges of the licence.</td>
</tr>
<tr>
<td>Not valid for mustering or agricultural flying.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Valid in Australian Airspace only.</td>
<td>This endorsement indicates that the medical certificate is issued despite the holder’s failure to meet a required medical standard, as the safety of air navigation is not adversely affected. Use in any other ICAO contracting state requires specific advance approval by the Regulator for that state.</td>
</tr>
<tr>
<td>Valid in Australian airspace Only, valid up to and Including CPL</td>
<td>Self-explanatory</td>
</tr>
</tbody>
</table>
## Designated Aviation Medical Examiner’s Handbook

### 1. Administrative Aspects

#### 1.5 Medical Certificate Endorsements

**Approved by Assistant Director, Aviation Safety Standards**  
**Version 3.0: December 2003**

<table>
<thead>
<tr>
<th>Endorsement</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not valid for ATPL operations.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Not valid for rotary wing operations.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Special conditions apply</td>
<td>Detailed, individually determined conditions are provided</td>
</tr>
<tr>
<td>Special conditions apply, Notified in accompanying letter dated dd/mm/yyyy</td>
<td>Detailed, individually determined conditions are set out in the referenced letter, which must be carried with the medical certificate whenever exercising the privileges of the licence</td>
</tr>
<tr>
<td>Holder to fly as or with a qualified co-pilot.</td>
<td>Refer 1.5.3 Multi-Crew Endorsement</td>
</tr>
<tr>
<td>Holder is required to inform employer of the nature and extent of his/her medical impairment and to co-operate in establishing mitigation strategies to minimise the effect of this impairment</td>
<td>Self-explanatory (Class 3 certificates only).</td>
</tr>
<tr>
<td>Holder may exercise the privileges of the licence without supervision, but there must at all times be another licensed air traffic controller who is aware of the holder’s impairment present and able to assume the holder’s air traffic management duties should the holder experience sudden incapacitation</td>
<td>Self-explanatory (Class 3 certificates only.)</td>
</tr>
</tbody>
</table>
1.5.3 Multi-Crew Endorsement

CASA uses multi-crew endorsements as a means of risk mitigation. Their use enables pilots to continue flying and air traffic control staff to continue duty despite the presence of medically-significant conditions which would otherwise pose an unacceptable risk to the safety of air navigation.

When a class 1 or class 2 medical certificate is endorsed with the condition ‘Holder to fly as or with a qualified co-pilot’, all of the following conditions apply:

1. The holder is restricted to operating either as or with a qualified co-pilot while exercising the privileges of the licence validated by the medical certificate. (Note that it is sometimes possible for an applicant to have an ‘as or with co-pilot’ restriction on a class 1 medical certificate but an unrestricted class 2 medical certificate).

2. Aircraft requirements:
   a. side-by-side seating in the cockpit
   b. fully functioning dual controls.

3. Certificate holder requirements:
   a. to wear shoulder restraint harness at all times
   b. to be prepared to relinquish command or control of the aircraft at the onset of any incapacity
   c. to ensure that the other pilot has read the requirements in this document.

4. Other pilot’s requirements:
   a. to occupy a control seat except for short absences in transport category aircraft in the cruise with the autopilot engaged
   b. to hold command endorsement for the aircraft
   c. to be current and appropriately rated for the flight
   d. to be aware of the type of incapacity the pilot may suffer in flight
   e. to be prepared to take command of the aircraft should the other pilot be unable to continue command.

Note: This condition does not:
   a. Preclude the medical certificate holder from being left on the flight deck alone in a 2-pilot operation; or
   b. limit the medical certificate holder from operating in a 2-pilot operation with another individual who has a medical certificate with this restriction; or
   c. preclude the medical certificate holder from operating as a single pilot on a flight deck should the other pilot in a 2-pilot operation become incapacitated.
When a class 3 medical certificate is endorsed with the condition ‘Holder is required to inform employer of the nature and extent of his/her medical impairment and to co-operate in establishing mitigation strategies to minimise the effect of this impairment’, the following applies:

The holder who has such a restriction on a class 3 medical certificate is required to inform his/her employer of the nature and extent of his/her medical impairment and to co-operate with the employer in establishing strategies to minimise the risk of his/her impairment causing acute incapacitation. Relevant strategies may include, but are not limited to, measures such as special roster or shift arrangements, specified meal breaks, or guaranteed access to prescribed facilities.

When a class 3 medical certificate is endorsed with the condition ‘Holder may exercise the privileges of the licence without supervision, but there must at all times be another licensed air traffic controller who is aware of the holder’s impairment present and able to assume the holder’s air traffic management duties should the holder experience sudden incapacitation’, the following applies:

The holder who has such a restriction on a class 3 medical certificate is not permitted to undertake duty alone and is required to ensure, at the beginning of each shift, that his/her co-workers are aware of the type of incapacity the individual may experience while working and that at least one co-worker is available at all times to take over the individual’s air traffic management duties should such a sudden incapacitation eventuate.
1.6.1 General Matters

Procedures for dispatching routine medical assessment reports to CASA will be detailed in the *MRS Online Program Manual* currently under development.

**Applicant statement and examiner certification forms** should be forwarded to CASA as soon as possible following completion. On receipt, they will be scanned and attached to applicants' medical files. (Note: CASA intends to develop more efficient alternatives to this procedure in subsequent versions of MRS Online).

ECG recordings, pathology and imaging reports and specialist consultation reports, as hard copies, should be forwarded to CASA as soon as possible following completion or when received by the examiner. Legible scanned copies of such documents may also be sent to CASA as attachments to medical assessment reports submitted online.

Lossy compression graphic formats such as JPEG should not be used because of the loss of information that accompanies the compression process. Do not attempt report scanning unless certain of the properties of the format used. CASA Aviation Medicine Section will provide further advice on request. (Note: CASA intends to develop subsequent versions of MRS Online that facilitate online lodgement of virtually all usually required documents).

Poor quality reproductions of such reports are of no use to CASA and DAMEs will be required to send replacements if MRS is unable to capture a legible image. This problem particularly arises with photocopies that are transmitted by facsimile.

Once a medical assessment report is received, the MRS Expert System will automatically determine whether or not the applicant clearly meets the medical standard(s) for the class(es) of medical certificate(s) sought. If the required medical standard is met, an automatic e-mail advice will immediately be dispatched to the originating DAME.

CASR 67 On receipt of such e-mail advice, a DAME may revalidate an applicant’s existing medical certificate for the appropriate period specified in the Regulations. Refer CASR 67.

CASR 67 If, for any reason, a DAME is unable to dispatch a routine medical assessment report immediately following its completion, but considers that an applicant meets the required standard for medical certification, the DAME may then revalidate the applicant’s existing medical certificate for the appropriate period specified in the Regulations. Refer CASR 67.
A DAME usually must not revalidate any medical certificate unless:

- e-mail advice from CASA confirms that the applicant meets the required medical standard; or
- he/she is unable immediately to dispatch a routine medical assessment report to CASA, but considers that the applicant meets the required medical standard; and
- the existing medical certificate does not bear the condition ‘Renew by CASA only’.

However, where the holder of a class 1 medical certificate which has been issued for 12 months is an ATPL aged over 40 who requires a medical assessment every 6 months to meet ICAO’s requirements (Refer to Section 2.15), a DAME may revalidate the existing medical certificate in the usual way for 2 months from the date of the examination, even though this period falls within the medical certificate’s continued validity for exercise of privileges in Australian airspace.

In this circumstance, the DAME should endorse the applicant’s medical certificate as follows:

‘Re-examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (this will usually be the date 2 months after the assessment date)
signature, date, DAME stamp

When a medical assessment report indicates that an applicant fails to meet the required standard for medical certification in any particular, the case will then be reviewed by CASA’s clerical assessors and/or medical staff and further advice provided to the applicant, DAME or other examiner as appropriate.
1.7 Aviation Reference Number (ARN) Identification

An applicant's Aviation Reference Number (ARN) must accompany all medical reports, ophthalmologists' reports, audiology reports and other specialists' reports and all correspondence concerning applicants sent to Aviation Medicine Section. All applicants should obtain an ARN prior to making an appointment with a DAME, DAO or DAEE for Original assessment. An ARN is required so the DAME or other examiner can connect to CASA's Medical Records System (MRS) to enter the applicant's medical details.

1.7.2 Aviation Reference Number (ARN) Registration

Application for an ARN can be made in person or by post. Application forms are available from the CASA website – refer Form 1162. Alternatively, visit one of the CASA Area Offices to apply in person.
A selection of frequently asked questions and answers to them is given below.

Q. When an applicant has had a required test or consultation independently some time before an equivalent CASA-required examination etc, under what circumstances will CASA accept such an examination in lieu of its own requirement?

A. The results of such external examinations are usually accepted only:
   - where the result/report is credible in all the circumstances;
   - where all parameters which CASA requires to be addressed in the report have been so addressed; and
   - where the reported findings are sufficiently recent to be likely still valid at the time of the applicant’s assessment for medical certification.

Note: CASA will not usually accept ophthalmological or audiometry reports which have not been completed on its own (electronic) stationery, even when these tests were performed for another Regulator, because of slightly different requirements and potential difficulty with interpretation.

Q. When an applicant has had a required test or consultation independently some time before an equivalent CASA-required examination etc, and it appears otherwise acceptable per provisions of the preceding paragraph, for how long will CASA deem such an examination to remain valid in lieu of its own requirement?

A. The usual maximum validity periods for independent routine test reports which CASA will accept are:
   - audiogram: 12 months
   - ECG: 6 months (applicant < 40 years), 3 months (applicant +/> 40 years)
   - fasting blood lipids/glucose estimations: 6 months
   - ophthalmology reports: 6 months

If any results are abnormal or equivocal, repeat studies will be required.

Q. When an applicant has had a clinically-indicated test or consultation independently some time before an equivalent CASA-required examination etc, under what circumstances will CASA accept such an examination in lieu of its own requirement?

A. CASA will deal with each such case on its individual merits. DAMEs and other medical practitioners involved in an applicant’s case management are encouraged to contact medical staff at CASA’s Aviation Medicine Section to discuss individual requirements.
Q. What are CASA’s requirements for medical certification of NZ-qualified pilots who are granted equivalent Australian medical certificates under the terms of the Trans Tasman Mutual Recognition Act (TTMRA)?

A. The TTMRA and the reciprocal NZ legislation apply only to professional licence holders, so effectively concern only Class 1 licence holders. The legislation is completely silent on the issue of medical certification, so CASA and CAA NZ have agreed to deal identically, as follows, with affected pilots whose initial qualifications were gained in the other country but who now have a local licence.

The CAA NZ medical certificate used to validate the original (NZ) licence may be used to validate the newly issued Australian licence until expiry of the NZ medical certificate. (For a class 1 medical certificate, this may permit a validity period of up to 12 months). The relevant authority for this is CAR 5.04 (2).

The licence holder is required to carry the CAA NZ medical certificate when exercising the privileges of the newly issued Australian licence, and also to observe any conditions set out on that medical certificate or in an accompanying letter issued by CAA NZ.

On expiry of the CAA NZ medical certificate, the holder of the licence granted under TTMRA is required to undergo a full CASA ‘Original’ Class 1 medical assessment, including ophthalmology report, audiometry, fasting blood lipid and glucose estimations and resting ECG. As for other Class 1 applicants, a stress ECG should be arranged if indicated. Thereafter, these licence holders will be required to meet identical requirements to all other Class 1 medical certificate holders, including the usual suite of periodically required screening tests.

Q. For how long after blood donation should licence holders/applicants who donate blood refrain from exercising the privileges of an aviation licence?

A. CASA recommends that holders of all classes of medical certificates should usually refrain from exercising privileges of any aviation licence for at least 24 hours after a routine blood donation. In other or unusual circumstances, consultation with a DAME or contact with CASA Aviation Medicine Section is advisable before resuming exercise of privileges.
2.1.1 Overview

Visual cues provide the pilot's most important sensory input. Good visual acuity over all working distances is essential for safe operation of an aircraft. Information should be sought about the range of visual performance required of each pilot so that relevant advice may be given about suitable correction, if required, and about protection against glare.

If there is any doubt whether a pilot meets the required visual standard, referral to a CASA Designated Aviation Ophthalmologist (DAO) or Designated Aviation Eye Examiner (DAEE) for a detailed assessment and report is mandatory. A standard form has been developed for routine ophthalmological examination required for professional aircrew and ATCs (see also 6. Aviation Medicine Forms). Original examinations must be undertaken by a DAO or DAEE.

**Visual Requirements Standard – CASR Part 67**

CASR 67 The visual requirements standards are found in the following paragraphs of CASR Part 67:

- **CASR 67.150**
  
  For medical standard 1

  CASR 67.150  
  Table 67.150  
  1.31 – 1.39

- **CASR 67.155**
  
  For medical standard 2

  CASR 67.155  
  Table 67.155  
  2.31 – 2.39

- **CASR 67.160**
  
  For medical standard 3

  CASR 67.160  
  Table 67.160  
  3.29 – 3.37
2.1.2 General Visual Requirements

The Medical Standards in the Civil Aviation Safety Regulations (CASRs) stipulate that the functions of the eyes and their adnexae shall be normal. This requirement encompasses more than simply visual acuity. All Designated Aviation Medical Examiners (DAMEs) and Designated Aviation Ophthalmologists (DAOs) and Designated Aviation Eye Examiners (DAEEs) must satisfy themselves that this criterion has been fulfilled before assessing a pilot as meeting the required visual standard.

All applicants for initial issue of a Class 1 and/or 3 Certificate must be seen by a DAO or DAEE. All applicants for issue of a Class 1 and/or 3 Certificate must be seen by a DAO or DAEE at the time of first renewal of medical certificate after reaching the age of 60 years and at two-yearly intervals thereafter.

2.1.3 Refractive Error

Some degree of refractive error is found in the majority of eyes. Most of these errors are simple and are due to a slight lack of coordination of development of the various parts of the refractive system. They represent, therefore, a biological variation from the norm and should not be regarded as pathological.

Pathological refractive errors are relatively uncommon. They are due to gross developmental abnormality. The degree of error is usually high and the visual acuity is often not fully correctable while, particularly in myopia, the eye may show degenerative changes.

At birth, the majority of eyes are hypermetropic. From then until the age of eight years, this hypermetropia is seen to increase. After age eight, refraction becomes less hypermetropic (or more myopic) until approximately the age of 25 to 30 years, when relative stability is reached.
If, therefore, a young applicant has had less than the average degree of hypermetropia at birth, the natural shift to the more myopic side can result in the development of overt myopia, a development that is likely to progress until the age of 25 to 30 years, when some degree of stability is reached.

It is difficult to give an accurate prognosis of the progress of refractive errors since individuals do not necessarily conform to the population norm, and those who develop frank myopia frequently progress to the myopic side more rapidly than those who remain on the hypermetropic side of the population norm.

CASA has not placed restrictions on applicants who require high levels of correction in order to meet the required visual standards. CASA considers that ability to meet the standard is all that is required, regardless of the power of corrective lenses necessary to achieve this outcome.
2.1.4 Refractive Surgery

Radial Keratotomy (RK)

The role of radial keratotomy in reducing refractive errors is a significant current issue in aviation medicine. Persons who have undergone this procedure are often subject to diurnal fluctuation in visual acuity. If this is significant, (i.e. loss of more than one Snellen line for professional licence applicants and more than two Snellen lines for private licence applicants) even if an applicant’s visual acuity is still within the pass standard, this fluctuation constitutes failure to meet the visual requirements of the standard(s) concerned.

Applicants who undergo radial keratotomy before their myopia has stabilised are at risk of continuing progression of their myopia.

The long-term consequences of radial keratotomy are not yet well documented, so it is impossible to predict any long-term implications for pilot licensing. Applicants should be reminded of this uncertainty as it may affect their chances of employment in the aviation industry.

Following radial keratotomy, the refraction takes some time to stabilise to its new value. Flying is not permitted while the refraction is still plastic. Evidence of stability requires:

- A variation not exceeding 0.25 dioptres in refraction
- A visual acuity changing by not more than one Snellen line
- Visual acuity, which at least satisfies the minimum standard for the class of licence, at three paired serial measurements.

These three paired serial measurements are to be part of a full ophthalmological examination, are to include measurements early in the morning and late in the day, and must be delayed for at least three months following surgery. Note that some eyes may not have stabilised even as late as a year after surgery.

A second problem associated with radial keratotomy is sensitivity to glare. This can cause considerable difficulty in the healing phase but tends to settle with time. Testing of visual performance with a bright light shining at the applicant should demonstrate any continuing glare sensitivity.

All applicants whose eyes have stabilised following radial keratotomy must thereafter have an ophthalmological assessment every two years for Class 1 and 3 and every five years for Class 2 Medical Certificates.
**Photo-ablative Refractive Keratectomy (PRK)**

This is a new technique, using a laser, for changing refraction. The long-term implications are as yet unknown. The requirements for assessing stability after radial keratectomy outlined above should be followed after photo-ablative refractive keratectomy.

### 2.1.5 Monocular Pilots

Monocular pilots may be divided into two categories:

- The monocular condition—the situation in which an applicant has only one functioning eye.
- The functionally monocular condition—the situation in which an applicant has two eyes, but the visual acuity of one cannot be corrected to 6/9 or better.

Provided the visual acuity requirements can be met in the functioning eye, with or without correction, a waiver is granted for Class 2 certification, limited to Australian Airspace, for both the monocular condition and for functionally monocular pilots. Likely Conditions on an applicant’s Medical Certificate are:

- Not valid for mustering or agricultural flying.
- Valid in Australian airspace only.
- Special conditions apply.

Functionally monocular pilots who can meet the visual acuity standard with the remaining eye may obtain Class 1 certification. These applicants are required to show that flight safety is not jeopardised by the reduced visual acuity or absence of the other eye. Only the Aviation Medicine Section can issue this waiver. Likely Conditions on the resulting Medical Certificates are as set out above for Class 2 Medical Certificates.
2.1.6 Visual Acuity

**Distant Vision**

Record the uncorrected distant visual acuity in each eye separately, also binocular acuity. If the applicant wears correcting lenses, record the corrected acuity also for each eye and binocularly. For original examinations, check visual acuity without contact lenses and then with contact lenses. Acceptable values are as follows.

**Student and Private Pilots**

For students and private pilots, acceptable values are at least 6/12, corrected if necessary, in each eye. An acuity of at least 6/9 (with or without correction) with both eyes open is also required.

If the student or private pilot applicant cannot achieve 6/12 (with or without correction) in each eye, the DAME should inquire about the defective eye and record the cause.

In cases of doubt, referral to a CASA Designated Aviation Ophthalmologist or prescribing optician is indicated. These applicants may be acceptable for non-commercial licences; however, their licences will carry endorsements restricting operations to Australia.

By definition, if an applicant achieves no better than 6/12 in the poorer eye, the applicant is considered to be functionally monocular.

Applicants assessed as suitable for licensing with appropriate endorsements are required to have a stable visual condition to which they have adjusted. This provision affects pilots who have poor foveal static visual acuity but whose peripheral vision is normal (in practice, amblyopia). Those who have completely lost an eye or its vision may be assessed as fit after the Aviation Medicine Section’s consideration of such factors as the extent of visual field loss and the duration of the condition.

**Professional Flight Crew and ATCs**

For all professional flight crew and ATCs: 6/9, corrected if necessary, in each eye separately. Additionally, the acuity must be 6/6 or better when tested with both eyes open.

Applicants with high refractive corrections (i.e. greater than +/-5 dioptres) should be advised of the possible complications, which may affect their vision, and of the implications for their aviation careers, particularly their increased statistical chance of retinal detachment.

**Note** The equivalent spherical error is taken as the sum of sphere power plus half that of the cylinder, the calculation taking account of arithmetical signs.
The High Myope

CASA prescribes no limit and high myopes who meet the standard after correction are assessed as meeting the standard. The final decision in cases of high myopia depends on the applicant’s functional visual ability and on the absence of significant ocular pathology.

Although high-density lens material has enabled the lenses in corrective spectacles for applicants with high myopia to be thinner and so not cause unacceptable peripheral distortion, contact lenses are the preferred method of visual correction for myopes who require more than 5 dioptres of correction.

Near Vision

Near vision at all ages must meet the standards specified in the CAR Schedule (N5 with or without correction at 30-50cm and N14 at one metre without correction). DAMEs must check this function at every periodic medical examination for all applicants for aviation licensing.

Professional flight crew should be advised to have periodic ophthalmological examinations from age 45 to detect early signs of developing ocular pathology.

If an applicant cannot meet the standard, he or she should be referred for an ophthalmological assessment and appropriate spectacles prescription.

Near-vision spectacles have a limited range of clear vision, which depends on the power of the lenses prescribed and on the residual accommodation of the wearer.

It is vitally important that the range of clear vision encompasses all the near objects that need to be seen clearly. Typically this ranges from the reading of maps and operating manuals at ordinary reading distance to reading the more distant parts of the instrument display at a distance of one metre or more.

It is important that the spectacles prescribed are suited to the near working distances imposed on the pilot by the configuration of the flight deck of the aircraft. This becomes increasingly critical as an applicant’s presbyopia progresses with age.

The pilot should measure the working distances encountered in all seating positions on the flight deck, and record them prior to having a prescription for near vision determined. A suggested checklist for pilots is as follows.
2.1.7 Working Distances Checklist

<table>
<thead>
<tr>
<th>Object</th>
<th>Nearest (cm)</th>
<th>Farthest (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flight instruments</td>
<td></td>
<td></td>
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<tr>
<td>Engine instruments</td>
<td></td>
<td></td>
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<tr>
<td>Checklists</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic Flight Instrument Systems (EFIS) and flight management display</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach charts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General charts and manuals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Overhead Panels**

Overhead panels can cause difficulty because of their close proximity to the pilot’s eyes. This proximity ensures that the presbyopic pilot has difficulty seeing legends and numerals clearly, yet in order to view through the near segment of bifocals or through look-overs it is necessary to tilt the head back awkwardly. This may present particular difficulty in some aircraft types.

Possible solutions to difficulty in viewing overhead panels:

- The simplest solution is to lift the bifocals (or look-overs) so that the head does not have to be tilted so far back.

- Flip-down spectacles can be provided with an additional lens power to focus the overhead panel clearly when viewing through the upper distance part of the bifocal lens. However, flip-downs are cumbersome and there is a risk that they may be left down, causing blurring of distance vision. There is also a risk that they may flip down inadvertently as a result of turbulence during some critical phase of flight.

- There are vocational multifocals available which have a near segment in the upper part of the lenses as well as in the lower part. However, the distance portion between the two segments is only 12 or 15mm deep giving a distant vertical field of view of only 21 to 26 degrees. Pilots may find this impedes their visual scanning.

- A special multifocal lens can be constructed to provide a small near viewing segment in one corner of the upper part of the lens.
The more complex solution should usually only be pursued if pilots experience significant and persistent problems with the overhead panel. The overhead panel usually does not demand perfect visual acuity and is not often used in critical phases of flight, so it should not be assumed that it presents serious operational difficulties.
2.1.8 Bifocal Segment Height

The height can be set so that the pilot views the instrument panel through the near segment as well as using it for charts and manuals at an ordinary reading distance.

Alternatively the segment can be set low so that it is used only for charts, manuals and reading. When viewing the instrument panel the pilot will look over the top of the near segment to use the distance part of the bifocal.

This choice will depend on:

- Whether or not the pilot is having any difficulty reading instruments on the forward instrument panel; and
- The pilot’s residual accommodation. (At least 2.75 to 3.50D of accommodation is required to see the instrument panel clearly and comfortably through the distance part of the bifocals.)

If the segment is set low, the bifocals may not be suitable for everyday reading outside the aircraft. A separate pair of reading glasses of bifocals for everyday use may then be required.

How to Determine the Correct Segment Height

Optometrists and spectacle dispensers are skilled at setting the segment height correctly, but flying is a demanding occupation and it is worth taking pains to obtain an accurate prescription for the height of the near segment.

It is worth checking segment height on chosen frames or single lens distant vision glasses by stretching adhesive tape across the frame or lens whilst the pilot is seated in the cockpit. The position of the tape can be varied until its upper edge is at the height desired for the top of the near vision segment.
2.1.9 The Need for Trifocals

As presbyopia advances, the power of the near spectacle correction must be increased to compensate for further loss of accommodation power. As a result, the range of clear vision decreases.

For a pilot aged about 45 with 3.50D of residual accommodation, the power of the near addition typically prescribed is 1.00D. For this person, the range of clear vision is from two metres to 220mm, which should be more than adequate for all flight deck near-vision tasks. However, a pilot aged 50 to 55 with only 1.50D of residual accommodation is typically prescribed a near addition of 1.75D, giving a very much smaller range of clear vision from 800mm to 360mm. This range is suitable for near tasks at ordinary reading distances but does not permit clear vision of those parts of the instrument panel beyond 800mm.

When this occurs, trifocals are required. Trifocals provide an intermediate segment that has approximately half the power of the lower near segment.

2.1.10 Acceptable Forms of Correction

To comply with operational requirements, reading correction must be in the form of ‘look-overs’, bifocal or trifocal lenses as appropriate. Single vision lenses for near correction are not acceptable. See the diagram below.

![Diagram of Bifocal Lens, Look-over Lens, and Single Vision Lens](image-url)
2. Medical Aspects
2.1 Ophthalmology

2.1.11 Progressive Power Lenses

These lenses provide a variable focus depending on which part of the lens is used for viewing. They provide a narrow intermediate visual channel and larger distant and near areas. These lenses may be associated with illusions of movement and distortion in the peripheral field of view. They should only be used for flying after adaptation in flight as a non-critical crewmember.

2.1.12 Contact Lenses

Provided the following criteria are met, contact lenses may be worn for correction of distance vision.

Both hard and soft contact acuity lenses are acceptable. The pilot must be able to wear the lenses throughout an ordinary day without experiencing any discomfort or deterioration of vision.

An acuity of 6/9 in each eye is required with correcting spectacles immediately after removal or displacement of contact lenses.

The pilot and the prescriber are responsible for ensuring that the pilot has adapted to the contact lenses sufficiently to perform his or her aviation duties. The duty period depends on the type of operations in which the pilot is engaged. The length of time that contact lenses can be worn without producing discomfort differs for private/pleasure flying and long haul commercial operations.

The choice of lens depends upon the nature of the correction required and on cabin conditions encountered.

Hard lenses tend to induce more discomfort and can be displaced by propeller wash or strong wind. Should a pilot need to remove the lenses in flight and substitute spectacles, post-wearing blur with decreased visual acuity should be anticipated.

Soft lenses do not cause those problems to the same extent. However, they may not fully correct astigmatism of greater than one dioptre.

For high myopes, soft contact lenses are preferable to spectacles. In the greatest degrees of myopia, the required visual acuity standards may not be able to be met using spectacles.

For initial issue examination, the contact lenses should be removed and the applicant’s visual acuity checked while wearing spectacles. The uncorrected vision should also be recorded. At renewal medical examinations it is not necessary for the applicant to remove the contact lenses unless the examiner considers this clinically indicated.
2.1.13 Sunglasses

Glare is often a cause of significant discomfort when flying above cloud or when flying into the sun. Sunglasses may be required in such circumstances.

There are two basic factors to consider when selecting sunglasses, namely the frame and the lenses.

Any spectacle frame reduces the field of vision. Narrow frames that carry large lenses are desirable. The most critical problem with frames arises from the presence of wide side-arms which significantly impair the peripheral visual field.

Sunglass lenses should protect the eyes from glare while not adversely affecting the visual cues necessary for safe flight. Accordingly, lenses should not be too dark, and should transmit at least 15% of incident light. The tint used should be "neutral density" (N.D.), that is, a greyish tint that does not distort colour perception or adversely affect red signal detection and recognition. The recommended tint is N.D.15.

Lenses of polycarbonate are preferred because of their impact-resistance and ability to absorb ultra-violet and infrared rays. However, these lenses can scratch readily and any scratched spectacles should be discarded.

To ensure that sunglasses provide adequate protection from solar radiation that may damage the eyes, only those sunglasses that conform to the current Australian Standard should be worn.

Sunglasses that conform to the current Australian Standard also meet acceptable standards for lens quality, frame strength and lens retention.

For aviation use, those sunglasses marked "Specific Purpose Sunglasses" are recommended, provided their frames are appropriate. The lenses of these sunglasses have been specifically designed for use in conditions of intense glare, such as in flight above cloud. At high altitude, atmospheric absorption of ultra-violet radiation is reduced.

Polarising sunglasses should not be used when flying. The polarising filter interacts with the cockpit transparency to produce a distorted and degraded visual field that poses a threat to air safety.

The pilot who already wears prescription spectacles for flying can choose from a number of options for glare protection. Prescription sunglasses with N.D.15 lenses can be obtained, or N.D.15 clip-on or flip-up sunglasses may be worn over prescription spectacles.

Pilots who require correction of their near vision only and who wear "look-overs" are advised to obtain bifocals and a plano upper segment. Clip-on or flip-up sunglasses can then be worn. However, the dangers of flip-ups previously mentioned should be recalled.
Graduated lens tint is another option. This provides glare protection for distant vision outside the aircraft, while near vision inside the aircraft is not impeded by the tint. It is usually considered that the use of a single tinted segment in bifocal glasses should be avoided as the visual effect of a "false horizon" may be disturbing and dangerous.

2.1.14 Photochromics

Spectacles can also be prescribed with photochromic lenses — lenses that change their density depending on the ambient light level. Under bright conditions they are like sunglasses, while in darker conditions they transmit light almost as well as untinted lenses. However, photochromic lenses have disadvantages that render them unsuitable for use by pilots.

Firstly, their transition times are relatively slow. Photochromic lenses take about five minutes to increase their density to the level of sunglasses, but more importantly, the bleaching time from maximum to minimum density can be as long as 30 minutes or more, although there is a rapid lightening of the lens in the first five minutes. This may be too long when there is a sudden variation in light during a descent into or under cloud, or because of a rapid change in cloud cover.

Their second disadvantage is that, even when fully bleached, photochromic lenses still absorb slightly more light than untinted lenses. Since vision is critically dependent on ambient light levels at night or otherwise when light levels are low, even this small decrease of light reaching the eye through photochromic lenses is undesirable. The inherent degradation of these lenses with time effectively prohibits their use in flying or controlling air traffic and applicants should not use them in these circumstances.
2.1.15 Colour Vision

Normal colour perception is becoming increasingly important as colour-coded cathode ray tube displays and colour coded visual approach lights become more prevalent. If any element of doubt exists about a pilot's ability to perceive colour normally, the case should be referred to the Aviation Medicine Section.

Commoner Types of Colour Vision Defects

<table>
<thead>
<tr>
<th>Type (Incidence)</th>
<th>Essential Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protanomaly (1.0%)</td>
<td>Colour matches are different from those made by normals (anomalous colour matching). Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Extreme protanomaly (0.2%)</td>
<td>Reduced colour discrimination for red, yellow and green. Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Protanopia (1.0%)</td>
<td>Confusion of red, yellow and green. Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Deuteranomaly (4.5%)</td>
<td>Colour matches different from those made by normals.</td>
</tr>
<tr>
<td>Extreme deuteranomaly (0.5%)</td>
<td>Reduced colour discrimination for red, yellow and green.</td>
</tr>
<tr>
<td>Deuteranopia (1.5%)</td>
<td>Confusion of red, yellow and green.</td>
</tr>
</tbody>
</table>

Test Procedure

The DAME is required to conduct a colour perception test, using the Ishihara 24-plate test. This test should be conducted even if the applicant is to be referred to an ophthalmologist. If the applicant should incorrectly identify more than two of the Ishihara plates, a test on a Farnsworth lantern is needed to determine whether or not he or she meets the colour perception standard.

The Ishihara plates test should detect all red/green colour vision defectives. Examiners should be aware, however, that some applicants may have learned the plates, and their presentation in random order is important. Other applicants have been trained to identify numbers on the plates by means of brightness cues or may even attempt to pass the plate tests by wearing an X-chrom or similar lens—a red contact lens worn in one eye which improves the colour defective's performance on the test.
Plate Testing

Reliable colour vision testing using the pseudoisochromatic plates requires that a standardised procedure be followed carefully. The main points are:

Illumination

Only the following are permitted:

- Daylight (but not direct sunlight). This is preferred.
- Fluorescent light from a fluorescent tube of 6,500 degree K colour temperature (normal daylight tubes).
- Phillips ‘Bleu’ incandescent lamp.
- Macbeth Colour Source C.
- Where an applicant is unable to pass the test when it is performed under artificial lighting conditions, it should be repeated in daylight before a failure is recorded. However, this additional test is not required where an applicant makes more than 12 errors or gives a history of known defective colour vision.

Position

The applicant may stand or be seated, but should look squarely at the test plates from about 75cm distance. The applicant’s position should be adjusted so that no specular reflection from the glossy surface of the plates is observed. The applicant should not move his or her head while taking the test.

Exposure Time

Each plate is exposed for a maximum of five seconds.

Procedure In Detail

1. Check the applicant's position, illumination, watch or clock with second hand.

2. Open the book at the first (demonstration) plate.
3. Read out at conversational speed, pausing perceptibly where indicated.

“I am going to show you some pages of dots. On some of them you can see a number, but some have no number. I want you to tell me if you can see a number and what it is. (Pause.)

If you can’t see a number, say "no number". You have up to five seconds for each page. (Pause)

Is that clear?”

4. Now expose each test plate in random sequence.

5. When the applicant responds, or after five seconds have elapsed, whichever is sooner, turn to the next plate. Most applicants respond almost at once.

6. If more than one response is given to a plate, eg, "It's either three or eight", say "which one are you going to choose?" If the applicant changes his or her response, record the second response.

**Marking Standard**

Applicants scoring two errors or less on the 24-plate edition of the Ishihara plates meet the required standard. Those making three or more errors need to be tested on the Farnsworth Lantern.

**Note:** If the DAME suspects that a filter aid is being used, each of the applicant’s eyes is to be tested separately and then binocularly. The results are to be notified to the Aviation Medicine Section.

**Further Testing**

Some applicants with defective colour vision may be safe for aviation duties, e.g. mild deuteranomals. The Farnsworth Lantern passes these while failing all protanopes and deuteranopes and most protanomals and the more severe deuteranomals.

The Australian locations of Farnsworth Lanterns are listed in 5. Colour Vision Testing. Farnsworth Lanterns are not transported to outlying areas. Examiners should refer applicants who fail the plate test directly to the nominated centres for Lantern testing. Such referrals should be noted on the examination form. If there is no record of such referral on the form, the Aviation Medicine Section notifies applicants of their right to undergo further testing.

**Note:** Applicants for original class 3 medical certification must pass the Ishihara Plate Test.
An applicant who fails to meet the colour perception standard (i.e. who fails both the Ishihara Plate Test and the Farnsworth Lantern, but who meets all other standards) is eligible for issue of an operationally restricted student pilot, private pilot or commercial pilot licence. The holder of such a licence is given a dispensation to operate at night in a suitably radio-equipped aircraft. This dispensation applies to Australian airspace only.

Class 1 and class 2 applicants who are unable to pass either the Ishihara Plate Test or Farnsworth Lantern Test may be further assessed by means of Practical Signal Light Test. Details are available from Aviation Medicine Section.

### 2.1.16 Cataract

Applicants who have undergone cataract extraction(s) and who achieve acceptable visual acuity with lens implant and/or contact lenses may be passed at all licence levels following individual assessment by the Aviation Medicine Section. Full reports are required.

All other cases of cataract should be referred to an ophthalmologist. A report including assessment and prognosis is required. The final decision in these cases is based on the ophthalmology report.
2.1.17 Demyelinating Disease

Multiple Sclerosis (MS) is a central demyelinating disease involving multifocal demyelination of white matter, which initially affects young people under 40 years of age. The diagnosis requires multiple attacks of demyelination separated in time and locations. A thorough neurological history is important at the time of presentation. Nuclear magnetic resonance imaging (MRI) offers some help in diagnosis but should not be substituted for good history taking.

The most common ocular manifestation of MS is optic neuritis. It is the presenting feature in 25% of cases and occurs during the course of established disease in 70%. Between 50% and 70% of patients in the 20 - 40 year age group presenting with optic neuritis subsequently develop systemic demyelination.

Optic neuritis typically presents as sudden unilateral blurred vision progressing over a few days. The vision is often described as being "washed out"; colours appear desaturated and there is often associated retro/peri-ocular pain aggravated by eye movements.

Signs include reduced acuity of variable severity from minimal to "no perception of light"; an afferent pupillary defect (pupil dilates during the "swinging light" test); and dyschromatopsia (poor colour discrimination performance).

The most common visual field defect is a central scotoma. Ophthalmoscopy may reveal a swollen optic disc although the disc is often normal in the retrobulbar type of MS. Optic atrophy (associated with previous attacks) may be found in the ipsi- or contra-lateral eye.

Visual recovery is slower than the initial loss and usually takes between four to six weeks. About 90% of sufferers recover normal visual acuity. Minor defects in colour vision and brightness appreciation may persist. The effects of subsequent attacks are additive. There is no correlation between the degree of visual defect during the attack and the final visual outcome.

All pilots with optic neuritis should be referred to a Designated Aviation Ophthalmologist. Examinations should include visual field plots of both eyes. A typical case may require CT and MRI scanning to rule out compression of optic nerves or chiasma.

Sinister features in applicants with MS include failure of visual recovery after four weeks, persistent periorcular pain, proptosis, development of a quadrantic or hemianopic visual field defect, and field defect in the contralateral eye. All cases with severe visual acuity loss (<6/60) should be further investigated.

Flying duties in between infrequent attacks are possible provided there is adequate neurological and visual function monitoring. All cases should be referred to the Aviation Medicine Section for final assessment after adequate work up.
2.1.18 Glaucoma

All applicants for flight crew licensing who have glaucoma, or whom the DAME suspects may have glaucoma, must be assessed by a Designated Aviation Ophthalmologist. The DAME should not revalidate their Medical Certificates.

Primary Glaucoma

Closed Angle Glaucoma

Applicants should not be passed until the condition has been surgically corrected. Once corrected, a pass assessment may be issued after ophthalmological review.

Open Angle Glaucoma

Most open angle glaucoma is controlled by medication. The Aviation Medicine Section may issue a pass assessment only after receipt of a satisfactory ophthalmologist's report, which must include results of perimetry.

Preferred treatment is with beta-blocker drops. However, applicants with glaucoma controlled by other means are assessed individually.

Open angle glaucoma that has been successfully treated by microsurgical or laser techniques may be assessed as meeting the required standard by the Aviation Medicine Section.

Open angle glaucoma controlled with drugs requires annual ophthalmological review, including perimetry.

Secondary Glaucoma

Medical assessment depends on the underlying disease and the effectiveness of control. All cases should be referred to a Designated Aviation Ophthalmologist.
2.1.19 Macular Disease

The symptoms of macular disease include blurring and distortion of vision with micropsia or macropsia, which can be assessed with an Amsler grid. (This consists of a piece of paper showing a 10cm square divided into 5mm squares with a central fixation dot).

The subject is asked to fixate on the central dot, with each eye separately, at one third of a metre and to mark on the chart with a pencil, scotomata or areas of distortion.

When abnormalities are present, immediate referral to a Designated Aviation Ophthalmologist is required.

The commonest conditions affecting the macula are Central Serous Retinopathy and Disciform Macular Degeneration. All cases require final assessment by the Aviation Medicine Section.

**Central Serous Retinopathy**

The condition affects healthy young men with a hectic lifestyle. Only one eye is usually affected and reduction of acuity is mild (6/12 or 6/18). With a direct ophthalmoscope, dulling of the macular reflex is seen, representing a shallow central retinal detachment.

Vision recovers spontaneously within six weeks in 90% of cases. Stereoaucity is temporarily lost and pilots should not fly until full recovery occurs. Laser treatment has been shown to speed the resolution of symptoms, but does not improve the final visual outcome, and no treatment is usually advised. The condition recurs in 20 to 30% of cases and the second eye is affected in 20%.

**Macular Degeneration**

This condition typically affects the elderly but inherited forms may affect younger people. Ophthalmoscopy may show small grey, yellow or white lesions, like small crystals, at the macula. These are called "drusen" (German, druse = nodule).

The visual acuity is usually well preserved, 6/9 or 6/12, until a further complication occurs — the development of a subretinal neovascular membrane that spreads under the macula and reduces vision to 6/60 or less.

To prevent the visual acuity from deteriorating below standard, regular follow-up is essential. In the early stages when the vision is distorted, but the acuity well preserved, the subretinal membrane can be obliterated by argon laser treatment.
2.1.20 Retinal Detachment

This may occur at any age although it is commoner in the elderly. Myopic people, particularly high myopes, are at increased risk. Advice on the long-term prospect of an aviation career should be given to those with high myopic refractive errors.

The most frequent type of retinal detachment follows collapse of the vitreous gel — Posterior Vitreous Detachment. The symptoms are a sudden shower of floaters (caused by vitreous haemorrhage or pigment release) and flashing lights, due to vitreous traction on the retina. Urgent referral to an ophthalmologist is mandatory to exclude the presence of a retinal tear.

At the stage when the retina is torn, but not yet detached, laser treatment may be used to seal the retinal tear before fluid from the vitreous cavity passes through it to detach the retina. Once the retina begins to detach, prompt surgery is necessary. If surgery can be undertaken before the retina detaches from the macula, the prognosis for maintained vision is excellent. Once the macula has been detached for more than a few hours, visual recovery is only partial.

A special form of retinal detachment, retinal dialysis, is the commonest type of detachment seen in young, otherwise healthy people who are not myopic. It may occur after a blunt injury, which causes a tear in the extreme periphery of the retina.

Intraocular gases are often injected into the vitreous cavity during retinal detachment surgery. The most commonly used gases are air, sulphur hexafluoride (SF6) and perfluoropropane (C3F8). Air takes only three or four days to be resorbed whereas the longest acting gas, C3F8, persists for up to six weeks. Air travel should be avoided until the gas bubble resorbs. Bearing in mind even in pressurised aircraft cabin altitude can be up to 8,000ft; a dangerous rise in intraocular pressure can occur if this precaution is overlooked.

In all cases of retinal detachment, once the condition is stabilised, a computerised visual field plot is mandatory before considering the applicant for return to pilot duties. The pilot should retain a copy of the plot for future comparison. The Aviation Medicine Section assesses each case individually.

2.1.21 Retinal Injuries

If a severe injury to the eye has occurred, with definite or suspected perforation of the globe, any aerial transport should be conducted at a cabin altitude of 4,000ft or less.
2.1.22 Strabismus

Whereas some degree of heterophoria is the norm, heterotropia (i.e. a manifest deviation of one eye from its normal position which occurs despite both eyes being open and uncovered), requires assessment by a Designated Aviation Ophthalmologist and final assessment, on an individual basis, by the Aviation Medicine Section. An applicant with an acuity (corrected or uncorrected) of worse than 6/12 is unacceptable, and a binocular acuity of worse than 6/9 is also unacceptable.

A majority of squint sufferers who have excellent cosmetic results from surgery and good visual acuity in each eye may still lack normal stereopsis (depth perception). They develop distance judgement by monocular cues and these are usually superior to those available to applicants who have lost an eye. However, their fine distance judgement for near distances is inferior to those with normal binocular vision. The Aviation Medicine Section individually assesses persons lacking binocular vision.

Squint may be latent or manifest. A latent squint is likely to become manifest under the influence of such factors as illness, fatigue, stress, drugs or alcohol. A cover test alternately on each eye unmasks latent squint.

The tests described below are designed to detect those who lack binocular vision.

**Cover Test**

Test at near (30cm) and at six metres. Use an accommodation fixation target at both distances. (For near an N5-size print and for distance a 6/12 letter). Ask subject to look at the fixation target, cover one eye and observe the other eye for refixation movement. Repeat test procedure for the other eye. Any refixation movement indicates possible squint.

**Lang Stereo Test**

Test at near (30cm). Hold card still and ask subject to name any pictures seen. Pass is three pictures: cat, star and car. A new Lang stereo test that tests to 200 degrees of arc is available. This may be considered superior to the standard Lang test that tests to 55 degrees of arc.

**Worth Four Dot Test**

Subject wears red/green goggles. Pass is identifying four lights, one red, two green and one white. Test at six metres only. Those who fail can undergo further tests, for example six-metre vectograph or Bagolini lens test to confirm if they truly lack binocular vision.
2.2.1 Introduction

This section details the requirements for cardiological assessment of an aircrew member or air traffic controller and provides guidance on the aeromedical disposition of pilots and cardiovascular disease.

The aim of the examination is to ensure that the applicant does not suffer from any cardiovascular condition which carries an increased risk of incapacitation or which produces a decrement of physiological functional reserve that may jeopardise operational safety.

The DAME should recognise that an individual with an unrestricted Medical Certificate must be capable of performing all of the activities that are possible under the licence held.

These activities could include:

- Aerobatics, with the possibility of high G forces being encountered
- Operations in extremes of temperature for long periods
- Operations at altitudes where the partial pressure of atmospheric oxygen is decreased to two-thirds that which exists at sea level.

2.2.2 The Cardiovascular Standard – CASR Part 67

The cardiovascular standards are found in the following paragraphs of CASR Part 67:

**CASR 67.150**
For medical standard 1

<table>
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<th>Description</th>
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<td>CASR 67.150(7)</td>
<td>Table 67.150</td>
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**CASR 67.155**
For medical standard 2

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**CASR 67.160**
For medical standard 3

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<td>Table 67.160</td>
</tr>
<tr>
<td>3.9 – 3.11</td>
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</tbody>
</table>
2.2.3 Assessment

The DAME should note relevant risk factors for ischaemic heart disease in assessing an individual's cardiovascular system. The risk factors to be considered are:

- Age
- Total cholesterol (fasting estimation)
- The total cholesterol to HDL cholesterol ratio (fasting estimation)
- Blood glucose (fasting estimation)
- Cigarette smoking
- Systolic blood pressure
- Hypertension
- Diabetes Mellitus
- Obesity
- Lack of regular exercise
- Positive family history of cardiovascular disease.

Obesity—while not a strong independent risk factor for ischaemic heart disease—when present, should be a trigger for more intensive evaluation of risk factors.

An applicant with multiple coronary artery disease risk factors should be considered for more detailed examination such as stress ECG.

**Mandatory Cardiovascular Risk Factor Profiling**

This is required for all Class 1 applicants in the years when fasting lipids are required.

Risk factor profiling is also required for all diabetic applicants of all classes of certificate at initial assessment after a diagnosis of diabetes has been made and at 5-yearly intervals subsequently.

A score should be calculated for the applicant with regard to age, lipid profile, systolic blood pressure, smoking, diabetes and LVH on ECG. At a score of 15 points, the 10-year probability of cardiac events approaches 1% per annum, which is the risk considered acceptable for professional aviators in a multi-crew environment. When the coronary risk score is 15 or above, applicants are required to have stress testing. It is a requirement for points-based stress tests, that the test is read and interpreted by a cardiologist. In situations where it is not feasible to have a cardiologist perform the stress test (eg, geographical access) then the test may be performed by a physician experienced in the performance of stress tests.

The requirements for mandatory 12-lead resting ECGs are detailed in section 1.4.1 Electrocardiographs in 1. Administrative Aspects.

### 2.2.4 General Principles

The following conditions are statistically associated with reduced functional capacity in cardiac reserve or with unpredictable risk of sudden incapacitation. Applicants with such conditions should therefore be assessed as medically unfit for certification. In individual cases, after thorough assessment, some may be granted Medical Certification.

- Uncontrolled systemic or pulmonary hypertension
- Any structural and/or physiological defect of the heart or circulation which results in regional circulatory ischaemia of a critical circulatory bed, or in ventricular hypertrophy or ventricular dilatation
- Any structural or physiological defect of the heart which results in electrical instability, either dysrhythmia or conduction defects
- A diagnosis of haemodynamically significant aortic stenosis
- Any structural or physiological defect of the heart or lungs which results in veno-arterial shunting and desaturation of arterial blood
- Any structural or physiological defect (and/or its consequences) that require the use of cardiotonic or vasoactive agents for compensation of cardiac reserve and for control.
2.2.5 Hypertension

Uncontrolled hypertension is disqualifying. A systolic pressure of 150 mm Hg and/or diastolic pressure of 90 mm Hg are the upper limits acceptable, but the applicant's age and sex should also be considered. If either or both the systolic and diastolic pressure repeatedly exceed(s) these limits, the applicant's blood pressure is not acceptable, even if on treatment. (These values accord with recommendations of the National Heart Foundation of Australia). Investigations by 24-hour ambulant blood pressure monitoring may assist diagnosis of borderline cases.

Controlled (adequately treated) hypertension is allowable at all levels of licence provided that there is:

- No significant end organ damage
- Satisfactory ECG
- No adverse drug side effects.

Acceptable Medication

Most modern antihypertensive agents are acceptable for control of hypertension in aircrew, provided the applicant is established on the medication and has exhibited no adverse side effects from the drug(s).

The applicant must not pilot any aircraft or actively control air traffic following the commencement of antihypertensive therapy or of a changed treatment regimen until such time as there are no significant side effects from medication and, in any event, not within one week of the commencement of therapy or change in medication. Preferred drugs include diuretics, ACE inhibitors, calcium channel blockers, prazosin angiotensin II antagonists and beta-blockers. Particular care should be taken with use of antihypertensive medications by aerobatic pilots, because of the reduction in G-tolerance produced by these agents.
2.2.6 Ischaemic Heart Disease

Technical Specifications of Investigative Procedures Required in these Protocols

Stress Electrocardiogram

1. Bruce protocol with a 12-lead ECG, with monitoring for at least five (5) minutes after cessation of exercise.

2. Applicant to reach at least 100% of predicted heart rate and at least nine minutes on the Bruce protocol or equivalent on the bicycle ergometer (maximum predicted heart rate = 220 beats per minute minus applicant’s age in years for men, 200 beats per minute minus applicant’s age in years for women).

3. Treadmill exercise is preferred but bicycle exercise is acceptable if the applicant is unable to perform on the treadmill.

4. Applicant should have been continuously in the time zone where testing is performed for at least 72 hours prior to the test.

5. Applicants should normally cease taking any beta-blocker 48 hours prior to the stress test, unless the medication is used to treat known ischaemic heart disease or a significant arrhythmia.

   When a beta-blocker is not so ceased prior to stress testing an applicant, an explanation of the reason is required from the treating or investigating cardiologist who supervises the stress test.

6. All reports of stress tests should include the following details:
   - duration of exercise (with comment if less than nine minutes);
   - level of perceived exhaustion of the applicant; and
   - any symptoms experienced by the applicant.

7. A positive stress electrocardiogram is defined by 1.0 mm or more of horizontal or down sloping ST segment depression at 0.08 sec after the J point.

8. A positive stress ECG is of adequate diagnostic validity if recorded when an applicant’s exercise capacity, heart rate and blood pressure responses reach at least 85% of predicted for age, sex, height and weight, and where the ST segment shift is consistent with ischaemia.

Note: A rise of more than 20 mm in systolic blood pressure response is expected. If the applicant returns a positive stress ECG with ST changes before reaching 100% of designated criteria, it is a matter of even greater aeromedical concern. Exercise electrocardiograms are a screening test for the presence of Ischaemic Heart Disease (IHD) but do not provide conclusive evidence of the presence of IHD. Applicants need not refrain from exercising privileges simply because they are required to undertake a stress ECG.
9. If an applicant is unable to reach nine minutes or equivalent on stress ECG then a gated heart pool scan and cardiologist’s opinion may be acceptable alternatives. In these circumstances, the reason for ceasing the test must be stated.

10. In appropriate circumstances (eg severe arthritis), pharmacological stress testing may be substituted. This should be discussed with CASA Aviation Medicine Section before it is undertaken.

11. The physician supervising the investigation should report exercise ECGs. Computer reporting of exercise ECGs is not acceptable to CASA. In addition, CASA expects that when a stress test is required for clinical reasons, the cardiologist or physician responsible for the test will clinically evaluate that applicant.

12. Where an applicant has undergone recurrent false positive stress ECGs with ischaemia ruled out by means of a stress nucleotide scan, future stress ECGs may be accepted as normal provided there is no significant change to the ECG findings from year-to-year and the level of exercise in METS remains satisfactory.

### Stress Echocardiogram

1. To be performed by an experienced laboratory, using standard recognised protocol, because of possible difficulty with interpretation.

2. Aim should be to achieve 100% of predicted heart rate, as for stress electrocardiogram, without developing any symptoms or signs of myocardial ischaemia.

3. For applicants undergoing pharmacological stress echocardiography using sympathomimetic stressors, atropine may be administered following the maximal dose of dobutamine.

4. A positive stress echocardiogram is defined by severe or extensive new wall motion abnormalities, horizontal or down sloping ST segment depression >1mV at 0.08 seconds after the J point compared with baseline; new ST segment elevation >0.1mV in applicants without a previous myocardial infarction, or significant tachyarrhythmia. Applicants who have a positive stress Echocardiogram should not exercise privileges until their cardiac status is clarified.

5. If an applicant is unable to achieve 100% of predicted heart rate or if the test is terminated for other reasons, the reasons for ceasing the test must be stated.

6. ECG recordings should be carried out contemporaneously during the exercise test, and should be commented upon by the interpreting physician.
Stress Nucleotide (Thallium or Sestimibi) Scan
2. Bruce protocol stress to a minimum of 100% of predicted maximal heart rate and at least nine minutes exercise time.
3. Applicant should have been continuously in the time zone where testing is performed for at least 72 hours prior to the test.
4. Applicant should continue to take his/her usual medication(s) until tested.
5. Re-injection or 24 hour view if defects are present. This additional requirement may be omitted if the defect(s) is/are demonstrated to be non-reversible.
6. A satisfactory exercise nucleotide scan is recorded when the exercise or nucleotide scanning does not reveal defects consistent with myocardial ischaemia. Applicants who have a positive stress radio nucleotide scan should not exercise privileges until their cardiac status is confirmed.
7. ECG recordings should be carried out contemporaneously during the exercise test, and should be commented upon by the interpreting physician.

Coronary Angiogram
1. The angiogram is to demonstrate all major vessels, their tributaries, and grafts if present.
2. Left ventriculogram should be performed.
3. A significant stenosis is considered to be present if there is greater than 50% narrowing of any artery.
4. A satisfactory coronary angiogram is recorded when there is no significant stenosis seen in the native coronary circulation and/or where coronary artery bypass grafts appear without discernible wall pathology or have only minor irregularities.
5. The report should include a diagrammatic representation of the coronary arteries.

Gated Blood Pool Scan
1. Measurement of the ejection fraction gated heart pool scan may be required for uncertain cases where the ejection fraction is borderline or unreliable on stress nucleotide scan or stress echocardiogram.
2. The scan should show an ejection fraction greater than 45%.
Electron Beam Computed Tomography and ‘Calcium Scores’

1. Aviation Medicine is considering the potential use of this technology. However, in common with other regulators, it does not currently accept the results of these investigations as substitutes for any other required tests.

Cardiologist’s Assessment

This is to include recording of:

1. Clinical status.
2. Control of risk factors, including smoking and obesity.
3. Hyperlipidemia, hypertension, or diabetes mellitus.
4. A satisfactory gated heart pool scan, which should demonstrate no wall motion abnormalities associated with moderate hypokinesis.
5. An overall ejection fraction greater than 45%.
6. An acceptable fasting lipid profile, where total cholesterol is less than 5.5 mmol/L and the HDL fraction is greater than 1.0 mmol/L. Note that both HDL and LDL fractions should be recorded.

Cardiologist’s Review

This is to occur at six-monthly intervals and should include recording of:

1. Clinical status.
2. Control of risk factors, including smoking and obesity.
3. Hyperlipidemia, hypertension, or diabetes mellitus.
4. An acceptable fasting lipid profile, where total cholesterol is less than 5.5 mmol/L and the HDL fraction is greater than 1.0 mmol/L. Note that both HDL and LDL fractions should be recorded.

Issue of Aviation Medical Certificate Following Myocardial Infarction

Class 1, 2 or 3 Medical Certificates

Following the infarction, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months after the event.
Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment at six-monthly intervals
- Stress nucleotide scan (preferred) or stress echocardiogram.
- Ejection fraction estimation
- Coronary angiogram, unless this has already been undertaken.

If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction.

Subsequent Reviews

12 months post myocardial infarction:

- Routine aviation medical examination
- Cardiologist’s review every six months
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

At yearly intervals thereafter:

- Routine aviation medical examination
- Cardiologist’s review every six months
- Stress ECG at yearly intervals.

Issue of Aviation Medical Certificate Following Coronary Artery Bypass Graft (CABG).

Class 1, 2 or 3 Medical Certificates

Following the graft, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

This will not be considered until six months after the surgery for Class 1, 2 or 3.

Recertification

Investigations required for recertification are:

- Routine aviation medical assessment
- Cardiologist’s assessment
- Stress nucleotide scan
- Ejection fraction estimation.
If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction.

**Subsequent Reviews**

12-month intervals post coronary artery bypass graft:
- Routine aviation medical examination
- Cardiologist’s review every six months
- Stress ECG yearly.

**Note:** Angiography is no longer routinely required every five years, but may be required if an applicant develops new symptoms or other evidence suggesting worsening IHD despite treatment.

**Issue of Aviation Medical Certificate Following Coronary Artery Angioplasty**

**Class 1, 2 and 3 Medical Certificates**

Following angioplasty, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

This will not be considered until six months post angioplasty for all classes. While preliminary data suggested that drug-eluting stents may reduce the incidence of post angioplasty stenosis, more recent studies reveal that drug-eluting stents are associated with an increased risk of late thrombosis. As such, bare metal stents are preferable in the aviation context. CASA is not prepared to reduce the six-month post-treatment period at this time. CASA will continue to monitor this issue.

**Recertification**

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram
- Ejection fraction estimation.

If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction at all classes.
Subsequent Reviews

12-month intervals post angioplasty:
- Routine aviation medical examination
- Cardiologist’s review completed six-monthly
- Stress ECG.

**Note:** Angiography is no longer routinely required every five years, but may be required if an applicant becomes symptomatic or has other evidence suggesting worsening HID despite treatment.

**Issue of Aviation Medical Certificate Following Evidence of Ischaemic Heart Disease**

**Class 1, 2 or 3 Medical Certificates**

When an applicant presents with:
- Ischaemic heart disease symptoms such as angina, arrhythmia; or
- Cardiac failure or other evidence of ischaemic heart disease, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

**Recertification**

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment conducted six-monthly
- Stress nucleotide scan (preferred) or stress echocardiogram
- Ejection fraction estimation.

If the stress nucleotide scan or stress echocardiogram is positive, the applicant must proceed to an angiogram.

If all investigations up to and including the stress nucleotide scan or stress echocardiogram are negative, the subject may be recertificated.

If the stress nucleotide scan or stress echocardiogram is positive but a subsequent angiogram is reported as satisfactory, the applicant may be recertificated.

**Subsequent Reviews**

This will depend on individual case assessment.
2.2.7 Valvular Heart Disease

Uncorrected Aortic Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist reports are satisfactory, the applicant may be recertificated for a period of one or two years depending on the severity of the condition and the rate of deterioration.

Subsequent Reviews

At annual or biennial intervals:

- Routine aviation medical examination
- Cardiologist’s review
- Echocardiogram
- ECG.

Corrected Aortic Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA.
Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.

Where a tissue valve is used and there is no requirement for anticoagulation and certification may be unrestricted.

Where a mechanical valve is used, the applicant is to have evidence of clinically satisfactory, well-controlled anticoagulation and Class 1 medical certification will be restricted to multi-crew operations.

Subsequent Reviews

Classes 1, 2 and 3 require yearly review by a cardiologist.

Uncorrected Aortic Stenosis

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Electrocardiogram
- Doppler echocardiogram
- Chest X-ray.
If all of the investigations and the cardiologist’s report are satisfactory, the applicant may be recertificated solo for a period of 12 months, provided the following criteria are met:

- Aortic valve calcification grade 1 or 2
- Valvular Doppler jet velocity <3m/s
- Valve area >1.0cmsq
- Asymptomatic.

**Subsequent Reviews**

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and the cardiologist’s report are satisfactory, the applicant may be recertificated solo for a period of 12 months, provided the following criteria are met:

- Aortic valve calcification grade 1 or 2
- Valvular Doppler jet velocity <3m/s
- Valve area >1.0cmsq
- Asymptomatic.

**Corrected Aortic Stenosis**

**Class 1, 2 and 3 Medical Certificates**

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.
Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and the cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.

Where a tissue valve is used and there is no requirement for anticoagulation, medical certification may be unrestricted.

Where a mechanical valve is used, the applicant is to have evidence of clinically satisfactory well-controlled anticoagulation, and Class 1 medical certification will be restricted to multi-crew operations.

Subsequent Review

Class 1, 2 and 3 all require annual review by a cardiologist.

Aortic Root Dilatation

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA.

Yearly assessment by echocardiogram is required once the aortic root size reaches 3.8-4.0cm/m² due to the risk of rupture.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram.

If all of the investigations and the cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.
Subsequent Review

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram.

Uncorrected Mitral Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months without restriction.

Subsequent Reviews

At annual intervals thereafter:
- Routine aviation medical examination
- ECG
- Doppler echocardiogram
- Cardiologist’s review.
Corrected Mitral Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Doppler echocardiogram.

If the valve is replaced, a significant risk of embolism may remain, particularly if factors such as poor left ventricular ejection fraction, left atrial dilatation, atrial fibrillation and poor INR control are present.

Cases will be considered on an individual basis. Assessments will not be made until at least six months post surgery.

For valve repairs, if reports are favourable, applicants may initially be recertificated for 12 months.

Subsequent Reviews

Valve Replacements:

For Classes 1, 2 and 3, annual routine aviation medical examination. All applicants require cardiologist’s review with Doppler echocardiogram.

Valve Repairs:

All applicants require a routine annual aviation medical examination and cardiologist’s review with Doppler echocardiogram.
Uncorrected Mitral Stenosis

Class 1, 2 and 3 Medical Certificates

Recertification
Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram.

Applicants with mild uncorrected mitral stenosis (where the valve area is greater than 1.5 cm², the heart is in sinus rhythm, where there is no history of atrial fibrillation and the left atrial diameter is less than 4.5 cm), are permitted recertification for 12 months.

Other applicants will be considered on a case-by-case basis.

Subsequent Reviews
At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- ECG.

Corrected Mitral Stenosis

Class 1, 2 and 3 Medical Certificates

Recertification
Investigations required for recertification following mitral valvotomy are:
- Routine aviation medical examination
- Cardiologist’s assessment, which is to include assessments of the incompetence and stenosis
- Doppler echocardiogram
- ECG.

If all of the investigations and cardiologist’s reports are satisfactory following mitral valvotomy, the applicant may be recertificated for a period of 12 months.
Following Mitral Valve Replacement

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA. This will not be considered until at least three months following mitral valvotomy or replacement.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Doppler echocardiogram
- ECG.

Following mitral valve replacement, applicants will be considered on a case-by-case basis on consideration of individual risk factors. Those with significant echocardiographic changes such as LA dilatation or atrial fibrillation may be subject to more stringent restrictions to their certificate.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram.

Uncorrected Mitral Valve Prolapse

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram.

Applicants will be assessed on a case-by-case basis. Those with mitral valve prolapse with minimal or trivial mitral incompetence should require no more stringent follow up than clinically indicated. Those with more significant sequelae will be considered in accordance with their ongoing risk and rate of deterioration of their condition.
2.2.8 Bundle Branch Blocks

Partial or Complete Left Bundle Branch Block (Not Including Left Anterior Hemiblock)

Class 1, 2 & 3 Medical Certificates

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan
- Doppler echocardiogram
- Left ventricular gated blood scan to measure ejection fraction
- 24 hour Holter monitor recording.

If all of the investigations and cardiologist's reports are satisfactory, the applicant may be recertificated for 12 months.

Subsequent reviews

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review.

Incomplete Right Bundle Branch Block

This is a common finding. There are no specific requirements.
Complete Right Bundle Branch Block

Class 1, 2 and 3 Medical Certificates

Note: This may be a normal variant in young applicants. A cardiologist’s opinion should however be obtained in these cases.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Echocardiogram
- Stress ECG if combined with LAHB as the combination is associated with ischaemic heart disease.

If all of the investigations and cardiologist's reports are satisfactory, the applicant may be recertificated for the maximum period permitted for the relevant medical certificate.

Left Anterior Hemiblocks

Class 1, 2 and 3 Medical Certificates

This is a common finding, however if this is a newly acquired condition, a stress ECG should be performed. If this is normal, there is no requirement for further reviews.

Atrio-Ventricular Blocks

First Degree

The only specific investigation required for those with first degree AV block is for a resting ECG, taken after exercise to ensure the block normalises with exercise. This may practically be done in the DAME office.
Second Degree — Class 1, 2 and 3 Medical Certificates

Otherwise, on diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Cardiologist’s assessment
- 24 hour Holter monitor recording
- Stress ECG.

If all of the investigations and cardiologist's reports are satisfactory, the applicant may be recertificated for 12 months. Applicants with untreated heartblocks of 2:1 or greater will not be recertificated for any class of medical certificate.

Subsequent Reviews

An annual ECG is required.

Third Degree Heart Block

Restricted certification may be available with the use of pacemakers.

Class 1, 2 and 3 Medical Certificates

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress ECG (to assess cardiac function)
- 24 hour Holter monitor recording.

Note: The pacemaker is to be dual chambered with bipolar leads, due to the unacceptable risk of electrical interference with pacemakers that have unipolar leads. The pacemaker is to have a technical check every 12 months, with the outcome reported to the Aviation Medicine Section.
Atrial Fibrillation and Atrial Flutter

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment, with particular reference to history and presence of any congenital abnormalities
- ECG
- 24 hour Holter monitor
- Doppler echocardiogram
- Stress test (to evaluate rate control at high workload)
- Biochemical profile, including: thyroid function studies, liver function studies, serum magnesium and potassium levels, fasting blood glucose (FBG).
- Haemoglobin estimation.

If drug treatment is required, there must be adequate rate control (as assessed by a cardiologist), without significant side effects. There should be no underlying structural heart disease. In these circumstances, all applicants may be recertificated for 12 months without restriction, unless prescribed warfarin. Where Warfarin is prescribed, CASA will require evidence of good INR control.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review.

Bradycardias

Bradycardia should be taken in context. In a normally fit and healthy person or in an athletic individual there is nil concern. If the individual is generally unfit, has symptomatic bradycardia or if other ECG anomalies are associated with the bradycardia, then the applicant should be referred for cardiological assessment.
2.2 Cardiology

Ventricular Tachycardias

Ventricular tachycardias is most commonly picked up in the context of a stress test, in which case it may be normal. If VT arises in other contexts, the applicant should be referred for cardiological assessment.

Supraventricular Tachycardias

Most individuals with frequent episodes of supraventricular tachycardias will receive radiofrequency ablation, which, if successful, will be of no further concern. If controlled by medication, cardiological review should be sought with each medical examination. Applicants with SVT will be assessed on a case-by-case basis, however those with frequent episodes, and particularly those who experience significant symptoms with SVT may not be considered fit.

Wolff-Parkinson-White Syndrome

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Electrophysiological studies.

If WPWS is confirmed, the applicant is assessed as unfit until radiofrequency ablation of aberrant conduction pathways has been performed and the treating cardiologist has certified that conduction has been normalised.

Individuals who have demonstrated long refractory periods, where the WPW abnormality normalises on exercise may be considered for restricted certification on a case-by-case basis.
Subsequent Reviews

At six months, 12 months and 24 months post successful radiofrequency ablation of aberrant conduction pathways, the following are required:

- Routine aviation medical examination
- Cardiologist’s review.

If there is no recurrence of abnormal conduction within 24 months of successful radiofrequency ablation, further recertification without restriction should follow the normal pattern for the applicant’s age and class of medical certificate.

Prolonged QT Syndrome

Those applicants with long QT syndrome will generally be disqualified due to the risk of sudden death. Individuals will be assessed on a case-by-case basis, based on cardiological opinion.

Brugada Syndrome

Applicants with Brugada syndrome on ECG will require individual assessment by an electrophysiologist and cardiologist. Stratification is difficult; however there may be a subgroup with a relatively good prognosis. However, most individuals with Brugada syndrome will be assessed as unfit. Insertion of implantable defibrillator is not adequate risk mitigation in these individuals.

Defibrillators

Applicants requiring implantable defibrillators will be assessed as unfit. Studies show that 15% of shocks delivered are inappropriate. They are also potentially affected by EMF emissions. In addition, the risk of acute incapacity associated with a shock, regardless of the underlying pathology, is considered incompatible with aeromedical certification.

Corrected Congenital Heart Anomalies

In many cases, residual haemodynamic defects may preclude medical certification at any level for these applicants. Each case will be dealt with on its individual merits. A comprehensive cardiological work-up and report should be completed and full details forwarded to Aviation Medicine Section for assessment.
Other Cardiological Abnormalities

These can be extremely varied and range from trivial conditions to those which absolutely preclude medical certification at any level for these applicants. Each case will be dealt with on its individual merits. A comprehensive cardiological work-up and report should be completed and full details forwarded to Aviation Medicine Section for assessment.

2.2.9 Cardiomyopathies

Dilated Cardiomyopathy

Class 1, 2 and 3 Medical Certificates

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Two recordings of 24 hours Holter monitor studies
- Gated blood pool scan or echocardiogram assessment of cardiac output.

If ejection fraction is greater than 45% with no symptoms and a normal Holter monitor report, then a restricted certificate, on the basis of cardiological assessment of ongoing risk of arrhythmia etc, may be allowed. Individuals will be assessed on a case-by-case basis.

Subsequent Reviews

Class 1: Cardiologist’s review with gated blood pool scan or echocardiogram.
2.2 Cardiology

Hypertrophic Cardiomyopathy

Class 1, 2 and 3 Medical Certificates

Recertification

This condition is generally disqualifying. In all cases, further certification will be appropriately restricted.

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment, including detailed family history
- Stress ECG
- Doppler echocardiogram
- 24 hour Holter monitor recording.

If all of the investigations and the cardiologist’s report are satisfactory, and septal thickness is less than 1.5 cm, restricted recertification may be available.

Subsequent Reviews

Requirements will be individually determined and notified.

2.2.10 Cardiac Transplant

Applicants for Class 1 certification will be assessed as unfit.

Class 2 and 3

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Coronary angiogram (for detection of atherosclerosis)
- 24 hour Holter monitor recording
- Doppler echocardiogram.

If all of the investigations and the cardiologist’s report are satisfactory, Class 2 and Class 3 applicants may be recertificated on an individually determined basis.
Subsequent Reviews

At six-monthly intervals:
- Routine aviation medical examination
- Cardiologist’s review.

At annual intervals:
- Stress nucleotide scan
- Coronary angiogram (to assess coronary atherosclerosis)
- Doppler echocardiogram.
2.3.1 Introduction

This section details the assessment procedures for pilots, other aircrew members and air traffic controllers who suffer or who may suffer from lung or respiratory system disease.

The aim of the respiratory assessment within the aeromedical examination is to ensure that applicants do not suffer from lung or respiratory system disease which places them at an unacceptable risk of incapacitation, or which may otherwise jeopardise the safety of air navigation.

2.3.2 The Respiratory Standard – CASR Part 67

CASR 67 The respiratory standards are found in the following paragraphs of CASR Part 67:

| CASR 67.150 | For medical standard 1 | CASR 67.150  
|-------------|-----------------------|---------------
| CASR 67.155 | For medical standard 2 | CASR 67.155  
| CASR 67.160 | For medical standard 3 | CASR 67.160  

2.3.3 Assessment

All applicants for Australian aviation medical certificates are administered a comprehensive screening questionnaire physically examined by a DAME, and required to undertake a number of screening tests.

When conducting the respiratory component of the aeromedical examination, the DAME should note the presence of relevant risk factors for the development of lung and respiratory system disease and the presence of signs and symptoms suggestive or diagnostic of such conditions.

For example: risk factors for the development of asthma include:

- Family history of asthma
- Personal or family history of smoking
- Other allergies or atopic symptoms.
FEV₁ is measured at the original assessment and each renewal assessment. (Note spirometers should be calibrated to BTPS). Chest X Rays may be required if the applicant’s history or physical signs so indicate. This is likeliest in smokers or ex-smokers. Routine Chest X Ray is not required.

Further investigation of respiratory abnormalities may include flow loop spirometry, measurement of diffusion capacity, blood gas estimation (both at ground level and at simulated altitude) and various forms of imaging of the respiratory system.

Referral to a consultant respiratory physician may be required to confirm a diagnosis or to resolve concern over a differential diagnosis. CASA may also require an applicant for medical certification to be assessed by a consultant respiratory physician as part of its consideration of an applicant’s fitness for aeromedical certification.

### 2.3.4 Documentation of Respiratory Conditions

Many respiratory conditions are principally diagnosed and classified on the basis of history. DAMEs should take a careful and thorough clinical history before reaching a respiratory diagnosis, particularly a diagnosis that may significantly affect an applicant’s employment prospects. Particular attention must be paid to chronic use of any medications that are incompatible with the exercise of the privileges of licensure. Also see Section 2.13 Medication – Drugs and Flying/Controlling.

### 2.3.5 Asthma

**Diagnosis and assessment**

In the first instance care should be taken to ensure an accurate diagnosis of asthma, noting that the criteria of recurrent, reversible airways obstruction should be met. Subsequent assessment of asthma should distinguish between severity and control. Severity is in part determined by the amount of treatment required to maintain control (as evidenced by type and quantity of prescription or over-the-counter medications required to control asthma symptoms, the requirement for oral steroid medication and the number of Emergency Room presentations or hospital admissions due to asthma). CASA will not usually certificate applicants who suffer from severe asthma. Uncontrolled asthma, regardless of severity, is not acceptable in the aviation environment, and will preclude the issuing of any class of CASA medical certificate.

Applicants who have asthma which is well controlled (if necessary using anti-inflammatory therapy) may be eligible for any class of medical certificate. Applicants with mild well controlled asthma maybe required to undergo periodic spirometry. In the case of applicants with moderate well controlled asthma, periodic assessment by a respiratory physician may be required. CASA will notify specific requirements on a case-by-case basis.
Asthma severity

Severe asthma

Applicants with severe asthma experience continuous symptoms, limited physical capacity, and have a FEV₁ or peak flow measurement of less than or equal to 60% predicted. Peak flow variability may be greater than 30%. Treatment requirements of patients with severe asthma will likely include moderate or high doses of inhaled corticosteroid, with or without long-acting beta-agonist, oral theophylline, or inhaled anticholinergic. Some applicants may require oral corticosteroid. Patients with severe asthma may require care through hospital Emergency Rooms or even hospital admission when control of the condition is poor.

Moderate asthma

Applicants with moderate asthma generally have symptoms of airflow obstruction most of the time, and experience some impairment of physical capacity. Their FEV₁ or peak flow will be in the range 60-80% predicted, and peak flow variability may be greater than 15%. Treatment requirements will likely include low to moderate doses of inhaled corticosteroid, (e.g. beclomethasone 400-1000 micrograms per day or equivalent).

Mild asthma

Applicants with mild asthma generally have intermittent symptoms, interposed between symptom-free intervals that may be prolonged. FEV₁ and peak flows are often normal, and there may be no peak flow variability.

Asthma control

For CASA’s purposes, good control requires that, in the three months preceding assessment, the applicant:

- Has experienced no or minimal cough, wheeze or breathlessness on exercise or during the night
- Has maintained "best" pulmonary function
- Has maintained stable exercise capacity, although possibly somewhat impaired
- Has not required treatment with oral corticosteroid
- Has not required an Emergency Room visit/hospital admission for symptoms of asthma.
2.3.6 Chronic Bronchitis and Emphysema

Smokers aged 45 or more should undergo increased screening for these conditions for all classes of medical certificates. Positive findings dictate a full respiratory assessment, including a report by a respiratory physician. It is unlikely that applicants with severe chronic bronchitis or emphysema will meet the medical standard for issue of a class 1 medical certificate. However, restricted class 2 and 3 certification may be possible, on a case-by-case basis.

2.3.7 Pneumothorax

*Traumatic Pneumothorax.*

Medical certification for all classes is usually possible after review of medical reports covering precipitating factors, associated problems, extent of recovery and subsequent lung function. Full assessment by a respiratory physician may be required.

*Single Spontaneous Pneumothorax.*

An applicant who has had a spontaneous pneumothorax with full recovery and no obvious cause nor likelihood of recurrence may be assessed as fit for all classes of medical certification.

*Recurrent Spontaneous Pneumothorax.*

An applicant with recurrent spontaneous pneumothorax (defined as two or more episodes on the same side) is not usually acceptable for any class of medical certificate. If the pneumothorax has been surgically corrected by pleurodesis (mechanical or chemical) or pleurectomy, the applicant may be assessed as fit. Assessment by a respiratory physician may be required.

2.3.8 Pulmonary Tuberculosis

An applicant with active tuberculosis (but not open tuberculosis) may be medically certificated for any class provided there is adequate evidence that he/she is on appropriate therapy and there is no evidence of side effects from the therapy. Applicants with fully treated pulmonary tuberculosis should be aero medically assessed to determine the extent of lung damage/recovery. Assessment by a respiratory physician is required in all cases.
2.3.9 Sarcoidosis

Sarcoidosis is usually acceptable for all classes of medical certification, provided myocardial and other system sarcoidosis has been excluded. Reports of full cardiovascular and respiratory assessments are required.

2.3.10 Pulmonary Embolism

An applicant who develops pulmonary embolism must be comprehensively investigated to determine if there are significant underlying reasons for the episode. Once recovery is complete and the applicant demonstrates normal pulmonary function (including normal blood gases), unrestricted medical certification at any class is usually possible. CASA will not usually consider re-certification until at least 8 weeks after the episode. Pilots who are prescribed long-term anticoagulation with warfarin following a pulmonary embolism may be granted conditional certification.

2.3.11 Fibrosing Lung Diseases

Applicants with these conditions require full respiratory assessment, including blood gas estimation. Thereafter, certification may be possible on a case-by-case basis.

2.3.12 Obstructive Sleep Apnoea (OSA)

This condition is often under-reported because applicants fear loss of certification. DAMEs must specifically inquire whether or not the applicant has conditions that suggest OSA eg, loud habitual snoring, witnessed apnoea. Where the diagnosis is entertained, the Epworth Sleepiness Scale must be administered to the applicant. If the resulting score is 16 or more, assessment by a sleep physician is required. Following definitive diagnosis of OSA, unrestricted medical certification at all classes is usually possible after appropriate corrective treatment has been instituted and demonstrated to be successful. This usually requires reports from a sleep physician, before and after treatment.

Also see ‘Sleep Disorders’ in Section 2.6.17 (Psychiatry).

The Epworth Sleepiness Scale provides an estimate of the likelihood of dozing or falling asleep, in contrast to just feeling tired.

Applicants suspected of suffering from OSA should be questioned about their sleepiness during normal activities. (Even if the applicant has not recently undertaken some of these activities, they should be asked to estimate their relevant chance of dozing based on prior experiences).
Use this scale to allocate scores under 'chance of dozing' in each situation described.

- **0** = no chance of dozing
- **1** = slight chance of dozing
- **2** = moderate chance of dozing
- **3** = high chance of dozing

<table>
<thead>
<tr>
<th>Situation</th>
<th>Chance of dozing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting and reading</td>
<td></td>
</tr>
<tr>
<td>Watching television</td>
<td></td>
</tr>
<tr>
<td>Sitting inactive in a public place (e.g. a cinema or meeting)</td>
<td></td>
</tr>
<tr>
<td>As passenger in a car for &gt; 1 hour</td>
<td></td>
</tr>
<tr>
<td>Lying down to rest in the afternoon when circumstances permit</td>
<td></td>
</tr>
<tr>
<td>Sitting and talking to a companion</td>
<td></td>
</tr>
<tr>
<td>Sitting quietly after an alcohol-free lunch</td>
<td></td>
</tr>
<tr>
<td>In a car, while stopped briefly in heavy traffic</td>
<td></td>
</tr>
</tbody>
</table>

**Total Epworth Sleepiness Score**

If the score is 16 or more, assessment by a sleep physician is required.

(The Epworth Sleepiness Scale is reproduced with the permission of Dr M.W. Johns, A new method for measuring daytime sleepiness: the Epworth sleepiness scale. Sleep, 14(6):540-545.)
2.4 Endocrinology

2.4.1 Introduction

This section details the assessment of pilots, other aircrew members and air traffic controllers who suffer or who may suffer from endocrine disease or from metabolic disorders.

The aim of the endocrine assessment within the aeromedical examination is to ensure that applicants do not suffer from endocrine or metabolic conditions which place them at an increased risk of incapacitation or which may produce a decrement in physiological or psychological function sufficient to jeopardise the safety of air navigation. In conducting the aeromedical examination, the DAME will recognise that an individual who holds an unrestricted medical certificate must be capable of performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities may include flight (either as a private or professional pilot):

- For prolonged duration, often as part of a shift roster
- Subject to disrupted sleep and time zone changes
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning

A number of these stressors may also affect Air Traffic Controllers.
2.4.2 The Endocrine Standard – CASR Part 67

The endocrine standards are found in the following paragraphs of CASR Part 67:

For Medical Standard 1:

“\textbf{A person suffering from diabetes mellitus may be assessed as meeting medical standard 1 if the condition is satisfactorily controlled without the use of any anti-diabetic drug.}”

For Medical Standard 2:

“\textbf{A person who suffers from diabetes mellitus may be assessed as meeting medical standard 2 if:}

\begin{itemize}
  \item[a.] The condition is satisfactorily controlled without the use of any anti-diabetic drug; or
  \item[b.] If an oral anti-diabetic drug is used to control the condition:
    \begin{itemize}
      \item[i.] The condition is under on-going medical supervision and control; and
      \item[ii.] The oral drug is approved by CASA.
    \end{itemize}
\end{itemize}

For Medical Standard 3:

“\textbf{A person who suffers from diabetes mellitus may be assessed as meeting medical standard 3 if:}

\begin{itemize}
  \item[a.] The condition is satisfactorily controlled without the use of any anti-diabetic drug; or
  \item[b.] If an oral anti-diabetic drug is used to control the condition:
    \begin{itemize}
      \item[i.] The condition is under on-going medical supervision and control; and
      \item[ii.] The oral drug is approved by CASA.
    \end{itemize}
\end{itemize}
2.4.3 Assessment of the Endocrine System

All applicants for Australian aviation medical certificates are required to complete a comprehensive screening questionnaire, to be physically examined by a DAME, and to undertake urinalysis for the presence of urinary glucose. In addition, applicants for Class 1 and Class 3 medical certificates are required to undergo fasting blood glucose estimation at the same time as they undergo five-yearly fasting lipid estimation. (CASA intends to introduce a requirement that applicants for Class 2 medical certificates will also be screened five yearly for diabetes mellitus by means of fasting blood glucose estimation).

When conducting an aeromedical examination, the DAME should note the presence of relevant risk factors for the development of endocrine or metabolic diseases and the presence of signs and symptoms suggestive or diagnostic of such conditions. Where such an endocrine condition is confirmed, evidence of secondary pathology or of accompanying complications should be sought and documented.

For example, risk factors for the development of diabetes mellitus include:

- Ethnic group
- Age >55 years
- Positive family history
- Obesity or significant overweight
- Abnormality of glucose tolerance
- Pregnancy
- Hypertension, dyslipidaemia, or clinical macrovascular disease
- Lack of regular exercise
- Use of diabetogenic medications.

Evidence of pathology secondary to diabetes mellitus may include vascular disease, retinal disease or renal disease.
2.4.4 Diabetes Mellitus and Impaired Glucose Tolerance

The incidence and prevalence of diabetes mellitus (of all types) has increased considerably in Australia in recent years. Up to 7.5% of the population now meets the diagnostic criteria for the condition (see Biochemical Investigations below). This is significant for aviation safety as diabetes mellitus is disqualifying for certification for aviation and air traffic control duties. The major aeromedical risk of diabetes relates to incapacitation (either overt or subtle), while it is also a major independent risk factor for a number of other incapacitating conditions—for example, stroke, acute myocardial infarction.

However, there is provision in the Civil Aviation Regulations for ‘a person who suffers from diabetes to be assessed as meeting the medical standard if the approved person conducting the relevant examination is satisfied that the diabetes is satisfactorily controlled without the use of an anti-diabetic drug’ or, for Class 2 and 3 medical certificate applicants, ‘where an oral anti-diabetic drug (approved by the Director of Aviation Medicine) is used to control the condition, the person provides evidence that he or she is undertaking on-going supervision and control of the condition’.

Classification of Diabetes Mellitus

Diabetes/diabetes precursor conditions are conventionally classified into four major types:
- Type 1 (absolute reduction in insulin production)
- Type 2 (resistance to the effects of insulin)
- Gestational
- Impaired glucose tolerance/impaired fasting glycaemia.

The majority of Type 1 diabetes mellitus sufferers use insulin regularly to manage the condition. Sufferers of Type 2 diabetes mellitus utilise a variety of management strategies: diet, oral hypoglycaemic agents and insulin, either singly or in combination.

Approximately one third of patients diagnosed with impaired glucose tolerance will subsequently have their glucose biochemistry return to normal, one third will continue to have impaired glucose tolerance and the remainder will eventually become sufferers of frank diabetes. Of aeromedical concern is the finding that all persons with impaired glucose tolerance have a statistically significant increase in their risk of developing ischaemic cardiovascular disease.
Biochemical Investigations

For medical certification purposes, any clinical suspicion of diabetes mellitus (such as urinalysis showing the presence of glycosuria) should be confirmed biochemically.

CASA recognises the following biochemical criteria, documented on at least two separate days, as confirming the diagnosis of diabetes mellitus:

- Fasting venous plasma glucose >6.9 mmol/l (less than 5.5 mmol/l—diabetes unlikely)
- Casual (random) venous plasma glucose >11.1 mmol/l (less than 5.5 mmol/l—diabetes unlikely).

Equivocal results of a fasting venous plasma glucose or casual venous plasma glucose estimation (between 5.5 and 6.9 mmol/l fasting or between 5.5 and 11.0 mmol/l casual) may indicate impaired glucose tolerance. In the event of an equivocal blood glucose result, DAMEs should order a 75 gram oral glucose tolerance test performed according to WHO 1999 guidelines and assessed according to the criteria in Table 2.4-1.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Criteria—Venous plasma Glucose concentration (mmol/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes mellitus</td>
<td></td>
</tr>
<tr>
<td>• Fasting value</td>
<td>≥7.0 or</td>
</tr>
<tr>
<td>• 2 hr post glucose load</td>
<td>&gt;11.1</td>
</tr>
<tr>
<td>Impaired glucose tolerance</td>
<td></td>
</tr>
<tr>
<td>• Fasting value</td>
<td>&lt;7.0 and</td>
</tr>
<tr>
<td>• 2 hr post glucose load</td>
<td>7.8–11.0</td>
</tr>
<tr>
<td>Impaired fasting glucose</td>
<td></td>
</tr>
<tr>
<td>• Fasting value</td>
<td>6.1–6.9 and</td>
</tr>
<tr>
<td>• 2 hr post glucose load</td>
<td>&lt;7.8</td>
</tr>
<tr>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>• Fasting value</td>
<td>&lt;6.1 and</td>
</tr>
<tr>
<td>• 2 hr post glucose load</td>
<td>&lt;7.8</td>
</tr>
</tbody>
</table>
Other Investigations

All applicants for medical (re-)certification who have either diabetes mellitus or impaired glucose tolerance must also provide to the DAME the results of all glycosolated haemoglobin (HbA1c) estimations performed in the previous twelve months. A minimum of three estimations is required, with the most recent being performed no more than one month prior to DAME examination. (HbA1c results should be reported in % HbA1c and should indicate the laboratory reference range for the estimations.)

In addition, CASA requires the following information and test results from applicants with diabetes mellitus:

- A recent report (within three months) from an endocrinologist or specialist physician:
  - Current status of control of diabetes
  - Whether the applicant has any history of hypoglycaemia/hyperglycaemia in preceding 12 months.
  - If so, whether there was any requirement for external intervention or assistance.
- A copy of the applicant’s diary of ambulant blood glucose monitoring throughout the three months immediately prior to DAME examination. Desirable ranges are:
  - No readings below 2.8 mmol/litre
  - At least 90% of values between 5.5 mmol/litre and 10 mmol/litre.
- A copy of the applicant’s most recent annual ophthalmological assessment detailing:
  - Clinical status
  - Visual acuity (with and without correction)
  - Presence of retinal disease
  - Presence of other ophthalmic pathology.
- A copy of a recent cardiovascular assessment by a cardiologist or specialist physician, including results of resting ECG and interval Stress ECG. The report should detail:
  - Clinical status
  - Presence and control of risk factors—for example, hypertension, smoking, hyperlipidaemia (total cholesterol, LDL and HDL)
  - Assessed risk of any acutely disabling cardiovascular event.
- The result of recent renal function tests, including 24 hour urine protein excretion.
- Certification that the applicant has completed and understood a course of diabetic management education.

There are no specific requirements for applicants who have impaired glucose tolerance or impaired fasting glycaemia where these conditions have not progressed to frank diabetes mellitus. However, CASA advises DAMEs to counsel affected applicants on the potential aeromedical certification consequences of their progression to frank diabetes mellitus and to initiate or refer them for appropriate clinical management.
Medical Certification of Persons with Diabetes Mellitus

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

Requirements for medical (re-)certification are set out in the following paragraphs.

1. Persons with diabetes mellitus controlled by diet may receive medical certification at Class 1, 2 or 3 provided they meet the following criteria:
   - Evidence of stable blood glucose control:
     - Glycosolated Haemoglobin (HbA1c) taken within one month of assessment <7.5%.
     - Satisfactory reports as detailed under Other Investigations
   - Absence of complications that could result in sudden or subtle incapacitation when exercising the privileges of a licence.

2. Persons with diabetes mellitus controlled by diet and oral hypoglycaemic drug(s) may receive unlimited medical certification at Class 2 or 3 levels only. Such persons who seek Class 1 (re-)certification may be offered (re-)certification with an ‘as or with co-pilot’ restriction. Prior to their (re-)certification, CASA requires objective evidence that these applicants meet the following criteria:
   - No unacceptable side effects from drugs
   - Evidence of stable blood glucose control
     - No episode of symptomatic hypoglycaemia during the preceding 12 months
     - Glycosolated Haemoglobin (HbA1c), taken within preceding month <7.5%
     - Satisfactory reports as detailed in the previous section, Other Investigations
   - Absence of neurological, cardiovascular, ophthalmological, renal or other complications of diabetes mellitus that could result in sudden or unpredictable incapacitation when exercising the privileges of a licence.

3. Persons with diabetes mellitus who require insulin treatment do not meet the mandatory medical standards and are not fit for medical certification. However, in appropriate cases, the Director of Aviation Medicine may exercise discretion and issue a Class 2 medical certificate endorsed with the conditions ‘as or with co-pilot only’ and ‘valid in Australian airspace only’. Prior to such certification, CASA requires:
   - Evidence of stable blood glucose control
     - No episode of symptomatic hypoglycaemia requiring intervention by others in the preceding 12 months
     - Serial Glycosolated Haemoglobin (HbA1c) estimations at two month intervals over the preceding 6 months—all results <7.5%
     - Satisfactory reports as detailed in the previous section, Other Investigations
Absence of neurological, cardiovascular, ophthalmological or renal complications of diabetes that could result in sudden or unpredictable incapacitation when exercising the privileges of a licence.

**Special Glucose Level Monitors**

Individuals with diabetes mellitus who receive aeromedical (re-)certification must possess and use a memory chip glucose meter for ambulatory blood glucose monitoring. The meter, together with a readily absorbable source of glucose, must be carried by the applicant while exercising the privileges of a licence. (When real-time ambulatory glucose monitoring becomes readily available in Australia, CASA may require this form of monitoring instead of monitoring with memory chip glucose meters.)

**Change in Treatment**

When an applicant’s oral hypoglycaemic medication is changed, or when its dosage is changed, he or she must not exercise the privileges of an aviation licence until the attending medical practitioner supervising the medication is satisfied that he or she is again stable and a DAME has recertified his or her fitness in accordance with CASA’s relevant medical standards.

**2.4.5 Thyroid Disorders**

The major aeromedical concern accompanying thyroid disease is the potential for abnormally high or low levels of thyroid hormone to affect an applicant’s cognitive function. Thyroid tumours have the potential to cause local symptoms or to metastasise to critical locations.

**Investigation**

Clinical suspicion of thyroid disease should be confirmed by appropriate investigations. These may include various imaging techniques, the use of fine needle biopsy, and biochemical thyroid function studies. CASA requires the results of thyroid function tests to establish that applicants are euthyroid prior to consideration for medical (re-)certification.
Medical Certification of Applicants Suffering from Thyroid Disorders

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. Requirements for medical (re-)certification are set out in the following paragraphs.

**Goitre**

Persons with goitre are acceptable for medical certification provided that there is no evidence of thyroid dysfunction nor of vascular or airways obstruction.

**Hypothyroidism**

Persons who are hypothyroid may be medically certificated provided Thyroid Function Tests (TFTs) demonstrate that adequate replacement therapy has been instituted and control maintained. TFTs should be performed annually for the first three years following initial diagnosis and periodically thereafter, as determined on a case-by-case basis, with serial results submitted with requests for medical re-certification.

**Hyperthyroidism**

Persons diagnosed as suffering from hyperthyroidism may be recertified once they are stable after surgery/isotope treatment/stable on medication and TFTs demonstrate that they are euthyroid. TFTs should be performed annually for the first three years after treatment is instigated and periodically thereafter, as determined on a case-by-case basis, with serial results submitted with requests for medical re-certification.

**Thyroid Cancers**

Thyroid cancer is disqualifying under Civil Aviation Regulations (1988). Persons diagnosed with thyroid cancer are obliged to refrain from performing licensed duties until they have been reviewed by CASA and a clearance to resume duties has been issued. While prognosis for cancer depends on many factors\(^1\), in most cases of thyroid cancer CASA will require documentation of successful removal of the tumour, completion of any subsequent radiotherapy, and the absence of metastatic disease before considering an applicant for (re-)certification. Under certain circumstances, conditional certification may be offered to pilots suffering metastatic disease.

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\(^1\) These factors include the type of cancer, the stage of disease when discovered, the aggressiveness of the individual cancer, cell type, the types of treatment available, co-existing diseases and the general health of the individual.
2.4.6 Gout/Hyperuricemia

Gout and hyperuricaemia arouse aeromedical concerns because of the potentially incapacitating effect of acute symptomatic gout, and of the potential for high serum levels of uric acid to lead to symptomatic urolithiasis.

**Investigation**

Clinical suspicion of gout/hyperuricaemia should be confirmed by appropriate investigations, which may include estimations of serum uric acid levels and of urinary excretion rate. CASA will require the results of these investigations prior to considering an affected applicant for medical (re)certification. In the event that an applicant with gout suffers from abdominal pain, he/she should be investigated to exclude renal stone.

**Medical Certification of Applicants Suffering from Gout/Hyperuricaemia**

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

CASA will certificate applicants with gout/hyperuricaemia when the condition is satisfactorily controlled (either by diet or by allopurinol) and has been asymptomatic for at least one month. Applicants should not exercise the privileges of a licence when being treated with colchicine.

2.4.7 Hypothalamic and Pituitary Disorders

**Pituitary Adenoma**

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

Persons with pituitary adenoma will be assessed as unfit. Subsequent medical certification will depend on considerations of residual tumour, effects of raised intracranial pressure, any pressure effects on the optic chiasm, the effects of surgery or other treatment, the effects of any hormone excess or deficiency, and the effects of any drug therapy. In some instances, an applicant may be certificated with restrictions and appropriate surveillance following special medical assessment. Annual review, including reports from an endocrinologist or specialist physician and from an ophthalmologist, will be required.
2. Medical Aspects
2.4 Endocrinology

**Diabetes Insipidus**

On diagnosis, inform the CASA Aviation Medicine Section and advise the applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

This condition is marked by polyuria resulting from failure of vasopressin secretion. Fluid deprivation tests are diagnostic. Treatment is with vasopressin or one of its analogues. After the treated condition has been stable for a minimum of six months, applicants may be medically certificated with restrictions and appropriate surveillance. All such cases require special medical assessment, and CASA will determine aeromedical certification, when appropriate, on a case-by-case basis.

2.4.8 Adrenocortical Disorders

Disorders of adrenocortical metabolism have the potential to incapacitate or impair the ability of a pilot or ATC to perform duties. In addition, the underlying causes of adrenocortical disorders may themselves have significant aeromedical implications.

**Medical Certification of Persons Suffering from Adrenal Disorders**

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

- Aeromedical disposition will depend on cause and nature of adrenal disorder. Each applicant will be considered on a case-by-case basis and full documentation will be required. Applicants should be clinically stable and adequately treated clinically for a minimum of three months before being considered for certification.
- Cushing’s Syndrome secondary to malignancy or ectopic ACTH secretion is disqualifying. Applicants with other causes may be certificated once the underlying disease has been effectively treated and hormonal status has returned to and been maintained within normal range for a minimum of three months.
- Applicants with Addison’s disease may be certificated once their underlying disease has been effectively treated and their endocrine status has returned to and been maintained within normal range for a minimum of three months.
2.4.9 Parathyroid Disorders

Parathyroid disorders and associated disorders of calcium metabolism have the potential to impair a person’s ability to control an aircraft or to act as an Air Traffic Controller. Hyperparathyroidism leading to hypercalcaemia increases the risk of renal stone formation, peptic ulcer, mental changes and cardiac arrhythmia. (Hypercalcaemia due to malignancy should be excluded in such cases.) The less common hypoparathyroidism, if associated with hypocalcaemia, may cause disabling neuromuscular irritability and abdominal cramps.

**Investigations**

Prior to (re-)certification of an applicant with parathyroid disease, CASA requires a report from an endocrinologist or specialist physician and copies of pre- and post-management serum calcium and PTH levels. If the applicant has suffered abdominal pain, CASA requires the results of imaging performed to exclude renal stones. Histology reports of specimens and the results of investigations to exclude underlying malignancy will assist in determination of the applicant’s fitness for medical (re-)certification.

**Medical Certification of Persons Suffering from Parathyroid Disorders**

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

- Applicants with hyperparathyroidism due to parathyroid adenoma may be (re-)certificated without condition(s) three months after surgical removal of the adenoma, provided that hormone and calcium levels have returned to and been maintained at normal levels. Hypercalcemia due to malignancy must be excluded. Full clinical details are required.

- Applicants with hypoparathyroidism may be (re-)certificated when estimation of hormone and calcium levels demonstrates that they have been stable on treatment (calcium and/or Vitamin D analogues) for at least three months.

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2 Note that poor venepuncture technique may lead to spurious PTH and calcium results.
2.4.10 Hyperlipideamia

Hyperlipidaemias are an important risk factor for the development of coronary artery disease, stroke and heart failure, which are important potential causes of in-flight incapacitation. Control of lipid levels is an important mechanism for reducing the risk of in-flight incapacitation due to vascular mishap. Similar considerations apply in the case of ATC staff.

**Investigation**

Blood for lipid estimation (including total cholesterol, HDL, LDL and glucose) should be drawn after fasting—that is, after the applicant has had nothing to eat or drink except water for 12-14 hours. Abstinence from alcohol for several days prior to the test may lower triglycerides levels. Dietary changes in the few days before testing have little effect on lipid levels.

**Medical Certification of Persons Affected by Hyperlipidaemia**

- Persons with elevated cholesterol/triglyceride levels controlled by dietary means and/or nutritional supplements are not of medical concern to CASA.
- CASA is primarily concerned over the potential for lipid lowering drugs to cause side effects of aeromedical significance. CASA will certificate pilots (both Class 1 and 2) or ATCs taking any of the lipid lowering drugs currently available on prescription in Australia, provided the applicant tolerates the medication well and experiences no significant adverse side effects. A minimum of one month of ground testing is required before the applicant returns to flying/controlling duties.
- Lipid estimation is part of CASA’s cardiovascular risk management program. Should a Class 1 or Class 3 medical certificate holder be found to have an annual risk of cardiovascular event greater than 1% (currently a score of 15 or more points on CASA’s cardiovascular risk assessment tool), he/she will be required to undergo a stress ECG per CASA protocol.
2.4.11 Obesity

Obesity, defined for CASA’s purposes as a BMI >35, is of medical concern because:

- It is an independent risk factor for the development of vascular disease.
- The physical dimensions of the obese person may reduce a pilot’s ability to manipulate an aircraft’s controls safely, or to escape in the event of an accident or incident.

**Investigation**

Applicants who have a BMI >35 must be assessed by a DAME, who is to seek evidence of other pathology secondary to the obesity. Obese pilots will be required to demonstrate their ability to control an aircraft safely and to escape in the event of an emergency as part of their certification assessment. This may involve undertaking a CASA directed operational flight/ground check.

**Medical Certification of Obese Applicants**

Obesity per se is only of concern to CASA from an air safety perspective if an applicant suffers from another aeromedically significant disease or condition secondary to the obesity or his/her physical dimensions affect the safe exercise of the privileges of a licence. Such applicants will be assessed on a case-by-case basis. Obese applicants who are otherwise well and can exercise the privileges of a licence safely will be certificated without restriction.

2.4.12 Anorexia

Adult applicants with a BMI <18.5 may suffer from an eating disorder. Prior to certification, a DAME should assess them to exclude such disorders. See section 2.6 Psychiatry.

2.4.13 Appetite Suppressants

CASA will not authorise pilots to fly or ATCs to perform ATC duties when taking any appetite suppressant medication.
2. Medical Aspects
2.5 Neurology

2.5.1 Introduction

This section on neurological disorders outlines some of the major categories of neurological diseases that are commonly encountered and indicates their aviation medical significance.

2.5.2 Nervous System Standard – CASR Part 67

The nervous system standards are found in the following paragraphs of CASR Part 67:

- **CASR 67.150**
  - For medical standard 1
  - CASR 67.150
  - Table 67.150
  - 1.7 – 1.8

- **CASR 67.155**
  - For medical standard 2
  - CASR 67.155
  - Table 67.155
  - 2.7 – 2.8

- **CASR 67.160**
  - For medical standard 3
  - CASR 67.160
  - Table 67.160
  - 3.7 – 3.8
2.5.3 Headache

Nearly all applicants have experienced headache. The diagnosis of primary headaches are not discrete and the different types should be considered to be part of a continuous spectrum ranging from Muscular Tension Headache at one end to Classical Migraine at the other. Secondary headaches from other conditions eg, Cranial Neuralgia, Temporal Arteritis should be considered separately.

When considering primary headaches it is important to assess the history according to:

- **Speed of onset**: Is there warning eg, aura or no warning?
- **Period of prodrome**: seconds, minutes or hours?
- **Frequency**: isolated or recurrent, if recurrent how often. Time off work is a useful guide.
- **Neurological symptoms**: aura (crippling or just perceived), photophobia, visual changes, paraesthesia, paralysis, dysphasia etc.
- **Severity**: need for acute and intensive intervention such as parenteral opiate analgesics, degree of incapacitation such as need for bed rest vs ability to continue complex tasks.
- **Treatments and their effectiveness**: How effective prophylaxis if used. Type of acute treatment used eg, Tryptins and speed of response and any significant side effects.
- **Precipitating factors**: such as diet, oral contraceptive etc and effect of avoidance or withdrawal of such factors.

Since objective investigations will most usually negative, a detailed history is essential. The best history is obtained at first presentation.

**Migraine**

For strict diagnostic purposes, migraine is an acute but reversible transient cerebral vascular insufficiency phenomenon and headache is not necessary the most important component. When the vascular insufficiency effect predominates it should be distinguished from transient ischaemic attacks. In the worst case migrainous stroke can occur where the implication for flight duties is similar to that for stroke.

Beware of Atypical Migraine without headaches.

In common usage, the term migraine may refer to any headache, but there are two main types — common migraine and classical migraine.
Common Migraine (Migraine without Aura)

More than 80% of migraine sufferers experience "common" or "non-classical" migraine, which is not associated with sharply defined neurological disturbances.

It is often a label used for Tension Headache perceived to be of significant severity by the patient. Careful history will avoid the diagnosis of migraine with its implication vs. Tension Headaches

Diagnosis of "nonclassical" migraine depends on:

- Detailed history of headaches
- Usually an absence of significant neurological symptoms.

Treatment usually does not include parenteral opiates or specific migraine drugs such as vascular active agents.

Classical Migraine

Classical migraine is accompanied by any transient focal neurological and/or vascular phenomena that may include:

- Unilateral headache
- Hemiparesthesia, Hemiplegia
- Retinal/Occipital phenomena, such as visual disturbance of various degree and scotomata
- Basilar artery phenomena
- Autonomic symptoms of nausea, vomiting etc.

Such migraines have variable periods of remission and rate of onset, and may completely incapacitate the sufferer. There is no universal exclusion of medication. Significant side effect should be explored and their presence or absence documented.

Adverse factors for aeromedical certification include:

- Sudden significant neurological symptom such as loss of vision, weakness and incoordination with no warning
- Failure or of prophylactic treatment with frequent attacks
- Requirement for intensive treatment
- Short prodrome that does not allow effective use of acute treatment before symptom onset.

The Aviation Medicine Section considers all cases individually.
Cluster Headache

Cluster headache is a subgroup of vascular headaches where the frequency of occurrence has a characteristic “cluster” nature. Aeromedical certification assessment considerations are similar to those for migraine. The details of history required are the same.

Other Types of Headache

Tension (Muscle Contraction) Headache

This category of headache can assume the nature of a vascular headache with a pulsating quality when it is severe and is often confused with migraine.

It includes headaches occurring secondary to other conditions that gave rise to muscular tension, e.g. eyestrain, cervical pathologies, psychiatric conditions in which management of the underlying cause is of prime importance.

Chronic tension headaches that require treatment such as anxiolytics or other drugs likely to cause a decreased state of alertness or diminished performance require specialised assessment.

Cranial Nerve Headache

The commonest of these conditions is trigeminal neuralgia. This may be idiopathic or secondary to underlying disease. Irritation of the nerve may be relieved by surgical intervention, which requires specialised neurosurgical assessment. Consideration must be given to the risk and implication for certification associated with any neurosurgery. The side effects of medications commonly used in its treatment include diminished judgement and diminished depth perception. Relevant history should be elicited and documented.

The Aviation Medicine Section assesses all cases individually.

Local Cranial Disease

Temporal arteritis

This condition need not be disqualifying if controlled, particularly when steroid therapy has been ceased. Full specialist reports are required for assessment.

Adverse factors associated with it include loss of vision and intracerebral involvement with significant functional sequelae.

The Aviation Medicine Section assesses all cases individually.
2.5.4 Blackouts, Loss of Consciousness and Syncope

These words are often used interchangeably by both laymen and medical professionals. A detailed description is more informative than the label. It does not necessary describe loss of consciousness (LOC) but can be used to mean an altered state of consciousness, vertigo or even psychiatric disturbance such as fugue-like states. Causes can be primarily neurological, secondary to cardiovascular pathology, gastrointestinal upset, physiological or even be specific to aviation causes such as G induced loss of consciousness.

History of the event is paramount in differentiation of the causes. The applicant should be directed to relive the experience in his/her own words, without prompting. Only when that is established should more direct questions about the circumstances before, during and after the event be asked. The patient’s account of sensations should be elicited. Observer history should be obtained if available. If uncertainty exists, record the uncertainty rather than introduce attempts at explanation. Such factual records allow further independent evaluation where necessary. The value and accuracy of the history deteriorates with time and repetition of recounting.

Specific features that will help in differentiating the physiological system involved are:

- **Prodrome**: absence or present.
- Posture at the time of the episode.
- **Period**: ie, duration of attack.
- Postictal orientation.
- Activity before, immediately and within 24 hr preceding.
- Head trauma.
- Frequency.
- Urinary incontinence.
- Tongue biting.
- **Observer report**: confirmation of patient’s account, particularly concerning convulsive movements. Time course to any convulsive movement is important ie, did it occur at the same time as LOC, or seconds later?
- **Bystanders’ action**: eg, promptly placing patient in prone or coma position, or keeping patient sitting/upright.
- Family and/or past history.
- Known cardiovascular history or risks.
- History of infection such as recent viral infection that may support labyrinthitis.
Depending on the historical features elicited, the need for referral to relevant specialist/s can be determined. If the cause is primarily neurological, refer to neurologist or neurosurgeon for clarification. For possible cardiovascular causes, cardiologist opinion should be sought. Where the history suggests vestibular problem, ENT opinion will be appropriate.

The Aviation Medicine Section assesses all cases individually.

**Concussion**

The term should be restricted to brief LOC in the setting of blunt head injury with no demonstrable intracranial injury. The emphasis is on the brief duration, which should be in the order of 5 minutes or less. If the event accords with these criteria and no sequelae are reported, it is generally of no significance for aeromedical certification. An exception is made for repeated concussions such as occur in boxers.

**Transient Global Amnesia (TGA)**

The cause of TGA is uncertain. It may be first warning of TIA. Current theory considers it to be a transient, migraine-type of vascular phenomenon. The condition should be distinguished from epilepsy, particularly complex partial epilepsy and symptomatic intracranial tumours.

Relapse can occur and may be precipitated by exercise, coitus, or exposure to water. A period of observation is necessary to monitor relapses. Risk of relapse is 30% and can recur once or twice. Where frequent attacks are present, other diagnoses should be considered.

The condition is benign and affected applicants can be aeromedically certificated following a suitable period of observation. Neurological reports are required in all cases and follow up reviews may be necessary.
2.5.5 Disorders of Equilibrium

**Benign Positional Vertigo**

This is a true rotational sensation accompanied by nystagmus, occurring only on change of head position. It is usually idiopathic or secondary to head trauma. Its course is variable. Assessment is based on the frequency of occurrences, their duration and severity.

**Acute Peripheral Vestibulopathy (Vestibular Neuronitis and Acute Labyrinthitis)**

Diagnosis implies temporary unfitness to fly. If the condition settles without recurrence, a return to unrestricted flying may be permitted after three months.

**Menière's Disease and Acute Recurrent Positional Vestibulopathy (ARPV)**

In these conditions, vertigo usually lasts for hours and often causes chronic disequilibrium. Menière's disease and ARPV have high recurrence rates. Applicants with these conditions are usually unable to meet the standard for certification, but require individual assessment.

**Alternobaric Vertigo**

In this condition, vertigo occurs on change of air pressure, often after a forceful Valsava manoeuvre to clear the ears. Oscillopsia and nystagmus may accompany it.

Occasionally this condition is due to chronic eustachian tube compression (e.g. by hypertrophied adenoids) and may thus be surgically correctable. Recurrent cases are assessed individually.

**Momentary Vertigo**

This is generally considered to be benign unless there is evidence that it significantly affects the applicant.

**Non-Functioning/Hypo-Functioning Labyrinths**

This condition is characterised by unsteadiness of gait, by loss of orientation (particularly in the dark) and by inability to maintain accurate visual fixation while in motion. It is often secondary to aminoglycoside administration. The degree of functional impairment should be fully investigated for decision by the Aviation Medicine Section.
Vestibular Imbalance

Applicants with this condition may experience feelings of unsteadiness on rapid change of position. It is generally benign and a "pass" assessment may be issued.

Multisensory Dizziness

This is a chronic condition of loss of balance or feeling of light-headedness in persons with multiple sensory disorders, such as a combination of two or more of:

- Peripheral neuropathy
- Vestibular imbalance
- Visual impairment
- Cervical spondylosis, and
- Hearing loss.

Multi-sensory dizziness is assessed according to the degree of disability present.

**Note:** Drugs used to control dizziness and vertigo often produce drowsiness. Control of these symptoms by drugs with such side effects is not acceptable for pilot or ATC medical certification. See also Section 2.13 Medication – Drugs and Flying/Controlling
2.5.6 Seizure Disorders

General

The tendency towards epileptic seizures is not an “all or nothing” phenomenon. Most people, under certain conditions, may have a seizure if sleep deprived or withdrawing from alcohol or benzodiazepines, especially if in addition they are taking medications that decrease the seizure threshold (e.g. tricyclic antidepressants). Approximately 2% of the population have a seizure during their lifetimes.

Following a single seizure, an adult has a 30-40% chance of recurrence. Those with a distinct epileptiform abnormality on the EEG, in the setting of a history of seizure, as opposed to non-specific abnormalities, have an increased risk of further seizures.

Diagnosis

It is imperative that there be an accurate diagnosis of the type of seizure. The importance of a description of the event cannot be overemphasised. While a useful diagnostic tool, any EEG must be reviewed by an experienced reader and must be evaluated in the context of the clinical history. It is not a useful sole diagnostic or screening tool.

The important components to the diagnosis are:

- More than one event, except Post Traumatic Epilepsy (PTE) for which one event will establish the diagnosis
- Must be unprovoked.

Video-EEG confirms the diagnosis but is not easily available as it is time consuming and difficult to organise except in academic research facilities.

Aeromedical certification considerations

A detailed history and specialist neurologist opinion is essential. Provoking factors must be considered. Their absence suggests a poor prognosis.

Significant adverse factors are:

- Unavoidable concomitants of aviation eg, strobe lights, propeller flicker, fatigue
- Difficult to avoid eg, menstruation.

Provoking factors that are avoidable or insignificant in context of aviation are:

- Alcohol excess and/or withdrawal
- Sleep.
These should be considered with regards to risk of occurrence in the absence of such factors.

Individuals with established epilepsy, ie, more than one unprovoked attacks, are unfit for aviation medical certification. Persons who have experienced seizures but who are not diagnosed as epileptic may be deemed to meet the medical standard.

**Partial (Simple or Complex) Seizures without progression to Generalise Seizures**

The term Partial Seizure often misleads patients to consider the condition is not as significant as the classical Grand Mal Seizure. Careful counselling of patients should include the explanation that such terms are anatomical and electro-physiological distinctions. The functional effect of impaired conscious state and/or brain activity is equally as significant as in other epilepsy.

**Sleep (Nocturnal) Epilepsy**

Epilepsy that occurs only when asleep is distinguished from sleep disorders such as Sleep Behaviour Disorder, Sleep Apnoea etc. Such disorders must be excluded. Sleep EEG recordings—best with video recording (if possible), will confirm the diagnosis.

The condition is associated with increased risk of seizure when awake ie, progression to the more “classical” type of epilepsy. This risk is increased when the condition is untreated.

Since aircrew and air traffic controllers are not performing flight-related duties when asleep, sleep as a provoking factor is not relevant in the aviation context. When the condition responds to anticonvulsants, the risk of such a seizure during flight related duties is further reduced.

Prior to certification, the effect of anticonvulsant control failure or “breakthrough” must be considered. Expert neurological opinion should be sought to determine if such a control failure occurs. The first presentation may be recurrence of sleep epilepsy or epileptic seizure whilst awake. Recurrence that first presents as fits whilst awake poses a flight safety hazard.

Aviation Medicine Section assesses all cases individually.

Important indicators of less risk are:

- No further occurrence of sleep epilepsy
- Absence of significant side effects of anticonvulsant.
**Childhood Seizures**

Childhood febrile seizures that are brief, not associated with neurological deficits and have ceased before the age of five are not generally disqualifying. The applicant must have been off all anti-epileptic medications for at least five years and the off-medication EEG, should be normal.

The seizures of Benign Rolandic Epilepsy of Childhood usually involve the face, tongue or hand and are often precipitated by drowsiness or sleep. The EEG shows significant abnormalities from the Rolandic area. Individuals with this condition may be considered for certification if they have been seizure free and off medication for ten years. They must have a normal neurological examination and EEG. A sleep deprived EEG should also be obtained and must be normal prior to issue of any aviation medical certificate.

Petit Mal or Juvenile Myoclonic Epilepsy is seizure disorders that occur in childhood. Because such conditions may persist into or present during adulthood, they are considered as subtypes of epilepsy. These conditions are associated with a risk of progression to generalised convulsions.

**The Single Epileptiform Seizure**

Extreme care must be taken to diagnose epileptic seizure in the presence of a single event. Clonic movements from transient brain hypoxia or from other causes are often reported as seizures. The condition should be considered as Loss of Consciousness (see above section on Blackouts, Loss of Consciousness and Syncope). Non-epileptic causes should be sought and excluded.

An individual with a single epileptiform seizure is initially unfit for medical certification. A case may be reconsidered five years from a seizure if the following conditions are met:

- Specialist neurological examination is normal
- Repeated EEGs, including sleep-deprived EEGs, do not reveal any significant abnormalities
- Studies incorporating additional nasopharyngeal or minisphenoidal electrodes, if relevant, do not reveal any significant abnormalities
- Neuro imaging, preferably by MRI, has demonstrated normal brain structure.

For continued medical certification five years after initial certification or recertification, all of the above investigations must be repeated and reported as normal. Applicants for Class 1 certification may be restricted to "as or with co-pilot" for a further two years. Individuals who have a second seizure are considered to have epilepsy.
When a single seizure was related to alcohol withdrawal, applicants may be considered for medical certification earlier if they have a normal EEG and Neuro imaging, and psychosocial and biochemical evidence is presented that their alcohol abuse is in a continuing "recovery" phase. The alcohol abuse should be dealt with as a separate medical problem.

Those who have had a seizure while on tricyclic antidepressant drugs or other seizure enhancing medications should be considered more prone to seizures than the average population. Both neurological and psychiatric opinions should be sought to manage their interrelated problems. Psychiatric report should indicate the optimum treatment required and if alternative treatment is suitable and/or available. The neurological report should indicate the applicant's risk of further seizures, particularly if using other psychotropic medication for psychiatric treatment.
2.5.7 Head Injuries

There are two major concerns over fitness for aviation-related duties following head trauma. One is the neuropsychological consequence of the trauma in applicants who have not had any clear focal deficits and the other is the possibility of Post Traumatic Epilepsy (PTE).

The neuropsychological consequences are secondary to the effects of acceleration/deceleration forces on the skull and brain. Because of the anatomy involved, these forces cause their greatest focal damage to the orbital, frontal and anterior temporal areas of the brain. Diffuse white matter damage may be associated with the cortical damage.

The result of such injury is dysfunction in a number of functional executive activities of the brain. Frequent effects include:

- Slowing of reaction time, impaired memory and decreased ability to maintain a high level of performance over time, particularly in settings of complex activities and choices,
- A high propensity for further mental decline with fatigue, and
- Other problems include maintaining attention, initiation and proper sequencing of tasks, difficulty in planning and anticipating, and difficulty in establishing automatic responses to a trigger.

The affected individual may not notice or care that the task is being poorly performed. Stress, fatigue and pain may exacerbate all these effects, and the handling of simultaneous emergency tasks is particularly affected.

Although the effects of head trauma may be severe, routine IQ and mental status testing may be within normal limits. Fortunately there is a natural tendency for neurological deficits to improve with the passage of time. There are a number of ways to predict the outcome of a head injury. The most commonly used is the duration of post-traumatic amnesia (PTA). Serial sequential neuropsychological tests separated by months or years can document changes associated with improvement of neurological deficit. A pre-trauma baseline test of such nature will provide the ideal reference but is not usually available. The limitations of neuropsychological testing should be recognised eg, learning; subjective interpretations by the tester, interface issues (particularly if computer-based) and its results should be interpreted with these limitations in mind.
Mild Brain Injury

This is characterised by:

- Transient loss or alteration of consciousness without any focal neurological deficit and with rapid return to alertness and orientation
- Post-traumatic amnesia (PTA), which occurs when a person is conscious but ongoing events are not recorded in the memory. The duration of this lapse must be less than one hour; and
- Post-traumatic syndrome (PTS) which comprises a symptom complex involving:
  - Dizziness
  - Emotional impairment
  - Intellectual impairment, and
  - Headache.

Applicants with mild brain injury are generally considered to be fit to fly unless there is a history of PTS, which takes more than six months to resolve.

Any alteration of consciousness associated with head trauma is a sufficient indicator of likely brain injury that flying should not be undertaken for at least two weeks — the period during which "early" post traumatic epilepsy is most likely to occur.

Even in the absence of other risk markers or of a neurological deficit, a more prolonged loss of consciousness and its associated post-traumatic amnesia should be followed by longer periods of suspension from aviation related duties, as follows:

<table>
<thead>
<tr>
<th>PTA Duration</th>
<th>Suspension Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 HR</td>
<td>1 month</td>
</tr>
<tr>
<td>1 HR - 24 HRS</td>
<td>3 months</td>
</tr>
<tr>
<td>&gt; 24 HRS</td>
<td>At least 1 year</td>
</tr>
</tbody>
</table>

In all cases, formal confirmation of neurological fitness should precede a return to flying and referral to the Aviation Medicine Section for a final decision is required.

Moderate and Severe Brain Injury

The significant factors in the assessment of head injuries, which produce moderate or severe brain injury, are:

- Extent and nature of any neurological deficit
- Risk of post-traumatic epilepsy (PTE).
2.5.8 Post-Traumatic Epilepsy Markers

A past history of febrile convulsions in childhood and/or a family history of epilepsy doubles the risk associated with any other markers.

Early post-traumatic epilepsy that occurs within the first week following injury carries a 25% risk of later epilepsy. Convulsive movements that accompany an impact head injury do not increase this risk. However, any convulsive activity following the immediate effects of impact, however shortly thereafter these occur, should be considered as "early post-traumatic epilepsy".

Demonstrated haemorrhage within the brain substance, particularly the cortical part, is associated with 25-45% risk of PTE. Depressed fractures or presence of blood in the subarachnoid space are not reliable guides to risk of PTE. However, the presence of such findings should alert investigators to search for bleeding within the brain substance.

Both CT scan and MRI are desirable in assessment of such bleeding. Availability dictates which test is performed. MRI has the advantage of being able to grade breakdown products from blood and can be very sensitive for late imaging where no initial CT or MRI was performed. Where possible an initial CT and/or MRI should be performed. If the history suggests a severe head injury and no initial imaging available a MRI should be performed to detect residual changes associated with bleeding within the brain substance.

A normal MRI should be reassuring.

Other markers are the presence or absence of a post-traumatic amnesic interval of more than twenty-four hours, focal signs, and early post-traumatic epilepsy.

Once the first post-traumatic week (the period of early PTE) has passed, the risk of subsequent PTE decays exponentially. By two years, the residual risk is less than 20% of that immediately post-injury and at four years it is less than 10% of that initially present.

When considering recertification, a residual risk of PTE of 1% or less is acceptable, given that the prevalence of epilepsy in the community is 0.33%.

Conditions that require careful assessment and which most commonly result in a "fail" assessment are: epilepsy, intracerebral haematoma, persisting CSF fistula, primary open cerebral laceration, and the presence of any significant permanent neurological deficit.
Recertification Guidelines

The Aviation Medicine Section applies the following guidelines:

1. Applicants with PTA lasting 30 minutes or less, who after the event have a normal neurological examination and no sequelae, may return to full duties in three to four months if the CT scan is normal.

2. Applicants with PTA from 30 minutes to 24 hours, with a normal MRI and EEG, are acceptable after 12 months. If a seizure occurred in the first week after trauma in an adult, a longer interval before re-licensing is required. Such cases are assessed individually.

3. If there is PTA greater than 24 hours, but Neuro imaging and neuropsychological testing are normal, applicants can be declared fit after two years. Flight simulator testing may provide additional valuable information in these cases.

4. Applicants with head injuries associated with intracerebral haemorrhage or focal deficit, whose neuropsychological testing does not show significant sequelae at 5-7 years post trauma, may return to duties after 7 years. Those who demonstrate abnormal neuropsychological sequelae have been more seriously injured and are considered individually. MRI is essential to determine presence or absence of bleeding.

5. Use of an anticonvulsant may mask the presentation of any PTE. The duration of the seizure free period should be considered as beginning only when applicant is off anticonvulsant medication. Where the risk of further seizures is considered to be too high to cease medication, the applicant is not medically fit for certification.

2.5.9 Neurosurgery

Opening the skull is not necessarily a permanently disqualifying factor for flight crew or ATC certification.

Assessment is based on:

- The underlying disease and its prognosis
- Any neurological deficit
- Surgical approach and any associated induced injury to the brain substance along the approach path
- Any risk of post operative epilepsy secondary to destruction or removal of cerebral tissue
- Location of the supratentorial/infratentorial lesion.

Full reports are required in all cases. DAMEs should issue a "doubtful" assessment and provide explanatory notes.
2.5.10 Cerebrovascular Diseases

These pathologies are usually secondary to or associated with other medical conditions and these should be sought and controlled besides dealing with the presenting cerebrovascular events. Investigations are more informative regarding the causes than the history alone. Imaging by CT scan, MRI or Angiography will differentiate the various types. Other investigations such as lipid profile, stress test for coronary ischaemia, ultrasound of carotid and heart, digital subtraction angiography etc should be considered to address non-cerebral conditions. The treatment of these non-cerebral pathologies may introduce factors affecting aeromedical certification, eg, use of an anticoagulant.

Specialist neurologist assessment is mandatory. Opinion should specifically include the risk of:

- recurrence
- epilepsy
- subtle or acute incapacitation.

Such assessment should be supported by reference to current literature with reasoned opinions.

Where subtle functional changes are suspected, neuropsychological testing to quantify the changes should be undertaken. These tests can be expensive and are open to varying interpretations.

Ischaemia

Assessment of transient ischaemic attacks (TIAs) and reversible ischaemic neurological deficits (RINDs) depend upon their causes.

- **Stenosis.** Although stenotic lesions may be bypassed or treated by endarterectomy, the risk of continuing TIAs and cerebral infarction remains high.

- **Embolism.** The risk of recurrent embolism or of haemorrhage secondary to anticoagulation is high.

- **Postural.** Individual assessment is required, but most instances are related to head movements necessary for flying.

- **Vascular headache.** See earlier section on Headache.

- **Blood hyperviscosity.** This condition may be due to polycythaemia, myelomatosis, Waldenstrom's macroglobulinaemia, etc. These cases are assessed individually and usually result in "fail" assessments if the hyperviscosity cannot be controlled.

- **Hypertension.** If adequate control is established with the use of suitable drugs, these applicants may be considered fit.
All precipitating or associated pathologies should be addressed and separate reports relevant to them included.

Aviation Medicine Section assesses all cases individually.

**Haemorrhage**

There are two major types of cerebral bleeding:

- Intracerebral haemorrhage, producing cerebral infarction
- Subarachnoid haemorrhage.

Most cases are secondary to leakage or rupture of an aneurysm; some are secondary to arterio-venous malformation. Surgery to treat them may cause injury to brain matter with associated post-operative epileptic risk. Details of the surgery should be included in reports.

20% have no identifiable cause but may be related to sustained hypertension or to transient elevation of blood pressure.

All affected patients are at risk of later developing normal pressure hydrocephalus with visual field loss and corresponding subtle incapacitation. This possible complication should be looked for and excluded as part of the follow up of all affected applicants.

Aviation Medicine Section assesses all cases individually.

**Cerebral Infarction**

Applicants who have suffered a cerebral infarct are generally considered unfit for at least one year. Recertification depends on:

- Underlying pathology leading to the stroke
- Absence of neurological deficit
- Risk of recurrence
- Assessed risk of future seizures.
2.5.11 Infections of Central Nervous System

**Meningitis**

All applicants diagnosed with meningitis should not engage in flight duties for six months. Return to flight duties depends on the nature of the infecting agent or cause of meningitis, eg, viral, bacterial or fungal, and the degree of recovery of resultant deficit and risk of development of epilepsy or hydrocephalus.

**Encephalitis**

This is dealt with as for meningitis.

**Brain Abscess**

Assessment is based on the underlying cause and whether the lesion is:

- Supratentorial, in which case the risk of epilepsy and the degree of deficit must be considered, or
- Infratentorial, where the nature and degree of deficit must be considered.
2.5.12 Degenerative Disease

Dementia

Dementia is defined as deterioration in cognitive abilities that impair the previously successful performance of activities of daily living. The examining doctor is in a better position to assess an applicant with possible dementia if there has been contact over some years and changes over time can be more readily appreciated.

Memory loss, particularly short term, is most common and tends to affect executive function. (Planning, initiation and regulating behaviour for systematic, goal-directed activity. It is highly involved in novel situations where long term memory “experience” is not adequate).

In the aviation medical examination, presentation of dementia tends to occur at early stage in the process, with consequently difficult diagnosis. Pathologies that cause secondary dementia should be sought and excluded before a diagnosis of primary dementia is made. Age of onset is not a reliable guide. With aging, frequency of all pathology increases. Dementia, primary or secondary, is one of the many manifestations of increasing age. In the absence of pathology, even advanced age is not a reason for refusal of medical certification.

In early dementia, diagnosis usually is made by exclusion. Where a positive finding is present eg, brain atrophy on CT scan, the diagnosis is more likely. However, the absence of such findings does not preclude the diagnosis. Investigations should be guided by pathologies that produce secondary dementia.

Clinical examination can be formal or informal. Abnormal performance of tasks such as form completion, or following simple instruction such as undressing should be recorded. Mini-Mental State Examination has limitations because of its dependence on the applicant’s linguistic ability, educational level and cultural background, particular in the early and late stages of the condition. Other reasons for poor test performance should be carefully considered before the result deemed positive. If test performance is normal, the presence of dementia is unlikely.

The greatest diagnostic challenge occurs where formal tests appear normal yet a family member or the examiner’s prior knowledge of the applicant indicates the presence of changes in mentation sufficient to cause concern. A flight performance report from instructors should be sought. Formal flight test may be necessarily. Assessment of flight performance must take account of the pilot’s experience and currency. Highly experienced pilots may perform adequately even when mildly impaired. Comparison with previous performance or with that of other pilots’ with similar experience should be sought.

Many dementias are progressive but some may be static. Where dementia has been demonstrated to be progressive, an immediate "fail" assessment is likely.
Note: If dementia is secondary to metabolic disease or correctable organ failure, there may be significant recovery of mental function following effective treatment. Aviation Medicine Section assesses all cases individually.

Normal Pressure Hydrocephalus

Treatment is not effective in preventing progression and subtle incapacitation may develop even in the presence of a working shunt. Assessment will be "fail".

2.5.13 Extrapyramidal Disease

Parkinsonism

This is characterised by:

- Rigidity
- Bradykinesia
- Tremor—although a "resting" tremor eases with movement, stress may produce a "reversal" with worsening of tremor on movement.

Parkinsonism can be a manifestation of other diseases and such causes should be sought and dealt with. Parkinson’s disease is a chronic, progressive disorder of primary Parkinsonism with no evidence of more widespread neurological involvement.

The functional effects of Parkinsonism can be variable. A careful record of neurological deficits, including effect on common activities, should be made. This will serve both as a quantitative appraisal tool and for comparison in evaluating subsequent progression of the condition.

A flight test is an essential component of evaluation. It should be the last of the tests performed and does not replace clinical assessment.

Applicants may be assessed as fit for certification if there is no adverse effect of treatment such as postural hypotension or "on-off" phenomena, and if the following features are adequately controlled:

- Bradykinesia
- Rigidity
- Tremor
- Adjustment of centre of gravity
- Voice quality
- Rapid scan eye movement.
Significant sequelae relevant to aviation safety include:

- Altered colour vision
- Dementia (late phenomenon)
- Depression (early as reaction to diagnosis, or later as a primary phenomenon)
- “On-off” phenomenon: abrupt but transient fluctuation in clinical state within the day, often as complication of levodopa therapy.

Progression to incapacitating symptoms or signs is generally slow. Shortened validity of certification is required to facilitate monitoring of changes. Class 1 certificate holders may require 6-monthly review and restriction to duties ‘as or with co-pilot’. All classes of medical certificate holders will require neurological review at least annually.

Applicants receiving treatment who display "on-off" phenomena will not be certificated to continue flight duties due to the likelihood of rapid onset of incapacitation within the time period of a typical flight.

2.5.14 Demyelinating Disease

**Multiple Sclerosis (MS)**

MS is characterised by multiple episodes of demyelinating attacks within the central nervous system. Diagnosis cannot be made following a single attack unless confirmed by MRI changes. A single attack with a single lesion on MRI does not confirm the diagnosis. Multiple lesions in the clinical setting of single attack may be consistent with the diagnosis.

The course of the disease can be relapsing-remitting or progressive. In the relapsing-remitting type some patients may remain static for many years while some will relapse at variable frequency. Favourable prognostic features are: isolated optic neuritis or other sensory change, complete recovery, age of onset younger than 40 years, female, fewer than two relapses in the first year of illness and minimal impairment five years after the first presentation.

Progressive type of MS has a 50% probability of functional deficit in daily life activities requiring assistance at 10-15 years from initial diagnosis.

Typical attacks in mild cases have onset over days rather than minutes. However in severe cases, attacks can present as an acute neurological event. Seizure is uncommon.
In all cases, assessment depends upon:

- Nature of symptoms
- Time between exacerbations
- Residual deficit
- Likelihood of sudden incapacitation
- Activity of the disease.

A flight test may be necessary to determine the effect of any residual deficit.

All cases of MS require formal neurological opinion. Aviation Medicine Section assesses all cases individually.

Any subsequent certification will require regular specialist reviews.
2.5.15 Intracranial Tumours

(See also Section 2.14 – Malignancy.)

Three factors affect the aeromedical disposition of applicants with intracranial tumours:

- Malignant or benign
- Treatment modality: chemotherapy, radiotherapy, surgery
- Degree of brain involvement.

Certification of applicants with secondary malignant brain tumours is principally a function of the characteristics of the primary tumour.

Certification of applicants with primary malignant brain tumours depends on prognosis in terms of malignancy and sequelae of any treatment received.

Certification of applicants with benign brain tumours depends on tumour size and location and the effect of any treatment.

Radiotherapy

Whole brain irradiation may be associated with late radiation injury effects. Focal irradiation may cause residual changes demonstrated on MRI. Such complications should be monitored for and excluded.

Chemotherapy

Systemic effects have to be considered in any aeromedical assessment.

Surgery

Effects occur regardless of the tumour’s malignancy. For tumours within the brain, aeromedical concerns are for brain substance loss, with associated neurological deficit, and surgically induced bleeding into brain substance, with associated post-“traumatic” epilepsy.

Essential factors for consideration are:

- **Site of tumour:** supra or infratentorial
- Surgical approach
- Details Of The Surgery: amount of intraoperative bleeding, retraction and compression of brain, and any intraoperative difficulties or complications.
The treating neurosurgeon’s report and opinion on the risk of epilepsy is a mandatory requirement for aeromedical assessment and must include:

- Details of any neurological deficit from brain substance loss or as result of surgical approach
- Risk of epilepsy
- Risk of recurrence of tumour.

Benign tumours not involving brain substance such as meningioma or acoustic neuroma should be considered in terms of:

- Treatment used: radiation and/or surgery
- Severity of compression effect on underlying neural structure: brain or nerve. In respect to brain compression, the potential for epilepsy should be considered.

A report from the specialist involved is required in all cases.

The effect of different treatment combinations and their likely sequelae requires expert neurological opinion on the particular therapy.

If there is no significant neurological deficit, these applicants may be assessed as fit for pilot and ATC duties. Applicants with small tumours, with no significant deficit after treatment by cryotherapy, after which there has been no evidence of epilepsy, may be assessed as meeting the required medical standard or as posing no significant risk to the safety of air navigation.

Applicants with history of childhood cerebellar astrocytoma who have been cured and who have no deficit or history of epilepsy may be assessed as meeting the required medical standard or as posing no significant risk to the safety of air navigation.

For adult subtentorial tumours, Aviation Medicine Section assesses all cases individually.

Nasal approach to pituitary tumours has a low risk of sequelae; the primary aeromedical consideration is endocrine effect and any residual compression effect on the optic nerves.

Malignant tumours fully excised, with or without associated radiotherapy, are considered according to their potential for recurrence, effect of the treatment, and their associated seizure risk. Those treated by radiotherapy alone will require long period of observation, usually in order of years, before the condition can be considered cured. Early certification is unlikely.

Applicant with benign tumours treated by radiation alone will be considered individually, dependent on the siting and any residual pressure effects on surrounding structures.

Benign intraventricular tumours will be considered individually, with any neurological deficit resulting from the surgical approach the main consideration.
2.5.16 Extracranial Neurological Disease

*Peripheral Nerve Diseases*

These disorders are assessed on the basis of the nature and degree of deficit. Autonomic involvement may produce syncope and is generally regarded as incapacitating. Full reports are required.
2.6  Psychiatry

2.6.1  Introduction

This section details the assessment procedures for pilots, other aircrew members and air traffic controllers (ATC) who suffer or who may suffer from psychological disorders or psychiatric disease.

The aim of the psychiatric assessment within the aeromedical examination is to ensure that applicants do not suffer from psychological disorders or psychiatric disease which places them at an increased risk of incapacitation, which may produce a decrement in psychological or higher cortical function, or which may jeopardise the safety of air navigation. A particular concern is the potential for an affected individual to commit an unsafe act that impairs the safe operation of an aircraft.

When conducting the aeromedical examination, the DAME should recognise that an individual who holds an unrestricted medical certificate must be capable of safely performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities (either as a private or a professional pilot) may include flight:

- For prolonged duration, often as part of a shift roster
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning
- Subject to disrupted sleep and time zone changes.

A number of these stressors may also affect Air Traffic Controllers.
2.6.2 The Psychiatric Standard – CASR Part 67

The psychiatric standards are found in the following paragraphs of CASR Part 67:

- **CASR 67.150**
  - For medical standard 1
  - CASR 67.150(7)
  - Table 67.150
  - 3.4 – 3.6

- **CASR 67.155**
  - For medical standard 2
  - CASR 67.155(7)
  - Table 67.155
  - 2.4 – 2.6

- **CASR 67.160**
  - For medical standard 3
  - CASR 67.160(7)
  - Table 67.160
  - 3.4 – 3.6
2.6.3 Psychiatric Assessment

All applicants for Australian aviation medical certificates are required to complete a comprehensive screening questionnaire, to be physically examined by a DAME, and to undertake a number of screening tests.

When conducting the psychiatric component of the aeromedical examination, the DAME should note the presence of relevant risk factors for the development of psychiatric disease and the presence of signs and symptoms suggestive or diagnostic of such conditions. (A Generic Template for an Aviation Psychiatric History is being developed to guide the conduct of an aviation medical psychiatric assessment and will be provided in due course.)

For example, risk factors for the development of alcoholism include:

- Family history of alcohol abuse
- Family or work stresses
- Financial pressures
- Single marital status.

Psychometric testing may assist in making a psychiatric diagnosis and referral to a consultant psychiatrist may be indicated to confirm a diagnosis or to resolve concern over a differential diagnosis. CASA may require a pilot or an ATC to be assessed by a consultant psychiatrist as part of its consideration of an applicant’s fitness for aeromedical certification.
2.6.4 Documentation of Psychiatric Conditions

Psychiatry is a subjective science. DAMEs need to take a careful and thorough clinical history before reaching a psychiatric diagnosis, particularly a diagnosis that may have significant occupational implications for pilots or ATCs. The Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations is provided to assist DAMEs in taking such a history and to bring consistency to their reporting.

In addition to requiring a traditional narrative report of psychiatric illness in aviators, CASA will henceforth require DAMEs and consultants to classify psychiatric conditions in aircrew and ATCs in accordance with the criteria defined in the Diagnostic and Statistical Manual of the American Psychiatric Association (DSM IV). Use of the DSM system will provide CASA with a tool to ensure the uniform assessment of all aircrew and ATCs diagnosed with psychiatric disease and allow CASA to make an informed assessment of the aeromedical risk posed by a particular applicant with a psychiatric condition.

DSM IV categorises psychiatric disorders and disease along several axes:

- Axis I - Clinical syndromes
- Axis II - Developmental Disorders/Personality Disorders
- Axis III - Physical Disorders and Conditions
- Axis IV - Severity of Psychosocial Stressors
- Axis V - Global Assessment of Function\(^1\).

The first three axes constitute the diagnostic assessment of a patient with a psychiatric condition. Conditions in Axis I (and to a lesser extent Axis II) are those most likely to be of aeromedical concern in the flying safety context. Axis III permits the clinician to indicate any current physical disorder or condition that is potentially relevant to the understanding or management of the case. (These are disorders or conditions listed outside the mental disease section of ICD 10).

\(^1\) CASA does not require an Axis V assessment. An amended assessment scale for assessing function in Aviators is under consideration.
Axis IV provides a scale for coding the overall severity of the psychosocial stressor(s) acting upon the patient that have occurred in the year preceding the current evaluation and that may have contributed to the development, recurrence or exacerbation of a mental disorder. The rating of severity of the stressor should be based on the clinician’s assessment of the stress an “average” person in similar circumstances and with similar socio-cultural values would experience from the particular stressor(s). Clinicians should also make an assessment as to whether the stressors are acute (less than 6 months) or enduring (greater than 6 months).

Axis V permits the clinician to indicate an overall judgement of a person’s psychological, social and occupational functioning (as an aviator or ATC) on a scale that assesses mental health-illness. Two ratings should be made using this scale; the first an assessment of current function and the second an assessment of best function during the preceding 12 months.

Thus, for example, a DAME reporting on an airman with psychiatric illness may summarise his condition as follows (in addition to providing a narrative of the situation):

Axis I: Major depression: single episode, severe, without psychotic features
   Alcohol dependence
Axis II: Dependent personality disorder
Axis III: Alcoholic cirrhosis of liver
Axis IV: Stressors: anticipated retirement; grounded by company; change of residence; loss of contact with friends
Axis V: (Not required by CASA at present.)
2.6.5 Disorders Diagnosed in Childhood

**Mental Retardation**

This disorder is characterised by significantly sub-average intellectual function with concurrent deficit or impairment in adaptive functioning. Onset is before the age of 18 years. Where the results of standardised, individually administered intelligence tests indicate significant reduction in an applicant's intellectual performance likely to limit the individual's ability to control an aircraft and where clinical assessment indicates a deficit in adaptive behaviour, CASA will not issue a medical certificate.

**Learning Disorders**

Learning disorders are diagnosed when an individual's achievement on individually administered, standardised tests in reading, mathematics or written expression are substantially below that expected for age, schooling and level of intelligence and when such deficits interfere with academic achievement or activities which require such skills. CASA will not issue a medical certificate to an applicant who has a learning disorder that precludes the acquisition of knowledge and information essential to safe flight.

**Motor Skills Disorders**

The essential feature of this group of disorders is a marked impairment in the development of motor coordination sufficient to interfere with academic achievement of activities of daily living. Recognition of this disorder usually occurs in childhood. Clinical course in variable, and in some cases, lack of coordination continues through adolescence into adulthood. In general, CASA will not issue a medical certificate to an applicant who suffers an impairment of motor skill sufficiently severe to threaten the safety of flight.

**Communication Disorders**

CASA will not usually issue a medical certificate to an applicant who suffers a communication disorder severe enough to compromise effective communication in the aviation environment. Practical testing may be required to establish the effectiveness of an applicant's communication abilities.
Pervasive Development Disorders

These disorders are characterised by severe and pervasive impairment in several areas of development relative to an individual’s developmental level or mental age. Autistic Disorder is the commonest of these disorders. The essential features of an individual with this disorder are impairment in reciprocal social interaction (which is gross and sustained), impairment in communication skills and markedly restricted repertoire of activity and interests. The symptoms and characteristics of autism can present in a wide variety of combinations, from mild to severe.

Other conditions in this group include Rett’s Disorder, Asperger’s Disorder and Childhood Disintegrative Disorder.

Sufferers of disorders in this group will usually be precluded from holding CASA medical certification.

Attention Deficit/Hyperactivity Disorder (ADD/ADHD) and Disruptive Behaviour Disorders

This disorder is amongst the most common neuro-developmental disorders found in children. Its hallmarks are hyperactivity, impulsiveness and inattention beyond the norm for a child’s age. There may be wide variations apparent in the severity of this disorder. Other psychiatric conditions frequently co-exist in children suffering ADD/ADHD. While the diagnosis is reliable if made to the criteria outlined in DSM IV, concerns over the validity of the diagnosis in a particular individual are frequently expressed. Sufferers of ADHD/ADD are significantly more likely to be involved in motor vehicle and industrial accidents (whether on pharmacological treatment or not) than similar groups of individuals who do not suffer from this condition(s).

Aeromedical concerns relate to the capacity of a sufferer of ADD/ADHD to safely control an aircraft and to the potential adverse effects of amphetamine medications frequently utilised to treat this condition. To consider an application for aeromedical certification from a sufferer of ADD/ADHD, CASA requires a thorough assessment of the applicant by a consultant psychiatrist (to confirm the diagnosis against the criteria indicated in DSM IV and exclude other conditions) and the results of neuropsychological testing. Where evidence exists of persisting deficiencies in cognitive ability, behavioural aberrancy or where an applicant requires continued use of amphetamine medication, the applicant will not be aeromedically certificated.

Refer to the Criteria for the Diagnosis of ADD/ADHD.
Conduct Disorder (Antisocial Personality Disorder of Childhood)

The essential feature of conduct disorder is a repetitive and persistent pattern of behaviour in which the basic rights of others or major societal norms or rules are violated. CASA will not usually consider certification for a medical certificate to an applicant with a substantiated history of conduct disorder.

Oppositional Defiant Disorder

The major feature of this condition is a recurrent pattern of negativistic, defiant, disobedient or hostile behaviour towards authority figures that often develops gradually in childhood and may continue into adolescence and even into adulthood. CASA will not usually consider medical certification for an applicant with a substantiated history of oppositional defiant disorder.

Tic Disorders

A tic is a sudden, rapid, recurrent, non-rhythmic, stereotyped motor movement or vocalisation. Tics may be simple or complex, may exist in isolation or be part of a condition such as Tourette’s Syndrome. Where an applicant's tic is believed to have implications for the safety of air navigation, CASA will not issue a medical certificate. Sufferers of Tourette’s Syndrome will usually be precluded from holding medical certification.
2.6.6 Delirium and Dementia

**Delirium**

Delirium is a disturbance of consciousness, accompanied by a change in cognition that is not due to pre-existing or evolving dementia. The disturbance generally develops over a short period, and often fluctuates during the course of a day. There is generally evidence from the clinical assessment of the aetiology of the delirium which may be due to a general medical condition, substance intoxication/withdrawal, use of medication, toxin exposure or a combination of these factors.

Aviators and ATCs with acute delirium should immediately be stood down/stand down from flying or controlling duty. CASA will only consider aeromedical certification once the applicant has recovered from the delirious state, and the underlying cause of the delirium has been identified and remedied.

**Dementia**

Dementias are characterised by the development of multiple cognitive deficits (including memory impairment and one or more of the following cognitive disturbances: aphasia, apraxia, agnosia, or a disturbance of executive functioning). While dementias share a common symptom presentation they may be differentiated on the basis of aetiology.

It may be difficult to make a diagnosis of early dementia in an individual who has enjoyed a well paid and responsible position in the aviation community for many years, but who is finding it impossible to learn new skills and to retain them (e.g. changing aircraft type). Anxiety or mood disorders may co-exist. Sympathetic handling and possibly psychological evaluation may prove helpful and the latter may be necessary to exclude or establish a diagnosis of pre-senile dementia. In such cases the decision about medical certificate revalidation will need to be based upon a very careful evaluation of all clinical and occupational information.

Once an applicant demonstrates a significant impairment of memory and other cognition, he/she should refrain from exercising the privileges of the pilot or ATC licence. CASA will not usually issue an aviation medical certificate to a sufferer of dementia.
2.6.7 Mental Disorders due to medical conditions not classified elsewhere

Reserved.

2.6.8 Substance Related Disorders

This group of disorders includes disorders related to the problematic use of a drug, including non-prescription medications, prescribed medications and drugs of abuse (e.g. alcohol, cocaine), other substances (e.g. volatile solvents) and to toxin exposure. For CASA purposes, this classification does not include nicotine abuse disorder. Some prescription drugs, whilst legally prescribable, are inappropriate when used by pilots or ATCs in the aviation environment (e.g. MS Contin). The safety of medications is dealt with in Section 2.13 Medication – Drugs and Flying/Controlling. The substance related disorders are divided into two major categories: the substance use disorders (abuse and dependence) and the substance induced disorders (substance induced intoxication, withdrawal, delirium, dementia, amnesia, psychosis, anxiety, mood, sexual dysfunction and sleep disorders). CASA will not usually issue an aviation medical certificate to a pilot or ATC who suffers a substance abuse disorder or who is involved in the problematic use of drugs.

**Drug Testing**

Current CASA practice is to ask all applicants for aeromedical certification (original and renewal), about possible problematic use of drugs and substances. DAMEs should also look for evidence of drug or substance use/abuse in their assessment of applicants.

Applicants who admit to the problematic use of drugs/substances or whom the DAME suspects of drug/substance abuse on the basis of other history or examination findings are required to submit a urine sample for drug screening. Urine samples for drug testing purposes should be provided as part of and at the time of the DAME medical certificate examination and should be passed under the direct supervision of the DAME. The sample should then be split into two clean containers and each sealed, the applicant being offered his/her choice of samples for independent testing. The other sample is to be forwarded to the testing pathology laboratory by the DAME. (Under no circumstances is this sample to be given to the applicant). Urine drug testing required by CASA is to undertaken at the applicant's expense.

As a minimum, urine samples should be tested for the following groups of drugs: cannabinoids, amphetamines, cocaine analogues, hallucinogens, opiates, sedatives and phencyclidine analogues. In addition, the requesting DAME should request testing for any other drug/substance that he/she suspects that the applicant may be using/abusing.

Any applicant who returns a positive urine drug screen and thus confirms his/her problematic use of drugs/substances does not meet the relevant medical standard. CASA will not issue a medical certificate unless an explanation acceptable to CASA is provided.
Alcohol Abuse/Alcoholism

A number of alcohol related syndromes are described:

- **Acute intoxication** with alcohol is a concern in the aviation workplace by virtue of the way in which it impairs psychomotor performance that may potentially lead to accidents and injury. The potential for catastrophic outcomes in the aviation environment arguably render it impossible to consider any episode of acute intoxication in a pilot on duty as “uncomplicated”. Current CARs provide specific requirements on “bottle to throttle time” for pilots and ATCS and it is intended that the new CASRs, when published, will limit the blood alcohol concentration of pilots and ATCs.

- **Harmful use of alcohol** is associated with damage to the physical or mental health of the individual; in the absence of a diagnosis of the alcohol dependence syndrome. Certain specific and severe consequences of alcohol misuse may also be diagnosed separately – notably alcoholic hallucinosis, Korsakoff’s psychosis and alcoholic dementia.

- The **alcohol dependence syndrome** is a cluster of biological, psychological and social phenomena that may be diagnosed where three or more of the following features are identified during the preceding year:
  - A strong desire/compulsion to drink
  - Difficulties in controlling drinking
  - A physiological withdrawal syndrome associated with abstinence
  - Increased tolerance to alcohol
  - Neglect of other activities due to drinking
  - Persistence of drinking despite harmful consequences.

- **Alcohol withdrawal** is associated with mild to severe symptoms, including sweating, nausea, tremor and anxiety. However, it may be associated with serious complications, including convulsions or delirium (“delirium tremens”).

- An isolated **drink driving offence** does not fulfil ICD-10 criteria for harmful use of alcohol (although it does fulfil DSM-IV criteria for alcohol abuse) and CASA will generally not take action in response to a single episode of PCA. However, such offences do indicate an increased probability that other alcohol related problems might be identified, and this probability increases still further where there have been multiple drink-driving offences committed.

**Note:** The FAA prohibits the medical certification of pilots who are convicted of two or more drink-driving offences within a 3-year period.
**Medical Assessment**

The experience of certain major airlines and licensing authorities is that success in rehabilitation of the alcohol dependent pilot can best be achieved by early intervention and treatment, adhering to the strict protocol outlined below. By using this program it has been possible to return aircrew to active flying within four months.

- **Immediate action.** A pilot or air traffic controller must be assessed as temporarily unfit on reasonable suspicion of:
  - intoxication whilst on duty
  - harmful use of alcohol
  - alcohol dependence
  - other alcohol related problems.

Such an assessment may be taken by the airline’s own medical officer, by the DAME or by CASA, or by a member of flight crew or operations staff.

Where a pilot is thought to be intoxicated whilst on duty, particular care and sensitivity are required and the specific action taken may depend, in part, upon the company drug and alcohol policy. However, where possible, it is important to obtain an objective assessment of the alleged intoxication at the earliest opportunity. This might involve use of a breath alcoholmeter, a blood alcohol analysis or urinary drug testing. Such procedures may only be conducted with the patient’s consent. Given that blood alcohol concentration falls fairly rapidly with abstinence, such testing should be conducted as soon as possible. Refusal of testing, and any reasons given for this, should also be recorded carefully. A period of less than 4 hours between detection and testing is considered usual.

- **Treatment and rehabilitation.** If psychiatric opinion and examination confirm “alcohol abuse with or without dependency”, then a residential in-patient program is a mandatory requirement if revalidation is to be considered. The treatment program undertaken should be directed by the treating psychiatrist and may or may not include pharmacotherapy.

Where the diagnosis is considered not to constitute “alcohol abuse with or without dependency” but where there is still a degree of concern regarding an alcohol related matter, then a less intensive treatment may be indicated. For example, such treatment may comprise a day-patient program, or outpatient counselling. The circumstances in which this may be offered must be a matter of judgement. (Arguably, heavy drinking as a cause of an elevated GGT or hypertension, but without any other complications or problems, might be an example of such circumstances.)
Follow-up and monitoring. DAMEs or CASA should be advised as soon as treatment is considered necessary so that follow-up review may be arranged to commence immediately following discharge from in-patient care. The patient should be reviewed immediately after discharge from in-patient care and on-going review should be at 3 monthly intervals (or more frequently if indicated) for at least 2 years, and less frequently thereafter. Overall monitoring should continue for not less than 3 years and in most cases will continue virtually indefinitely, or until the pilot retires. This is because of the significant risk of relapse, which continues for many years following treatment. Review will require supportive, corroborative evidence of continuing abstention from the family, the family doctor and from others in close contact at home or in the workplace. At each review blood tests should be repeated as support for the monitoring process (see above).

Continuous attendance at Alcoholics Anonymous or an equivalent organisation is required in most cases. It is also desirable that a peer group member on the same aircraft fleet should act as a “buddy” to supervise the individual’s progress and report to the relevant authority at intervals.

Treatment goals. Total abstinence will usually be the only acceptable treatment goal. For less serious cases (e.g. an elevated GGT with no other evidence of problems arising from alcohol consumption), an attempt at controlling drinking may be allowed, and in such circumstances in-patient treatment will not be required. However, this will be the exception rather than the rule and, in cases of doubt, in-patient treatment and abstinence should both be considered essential for recertification.

Certification. At the end of the first four months of treatment, and provided that abstention is secure, the pilot may be allowed to resume his/her flying role but only in a multicrew capacity. A period of at least two years multicrew limitation will be required, assuming good progress, before solo operations will be authorised. Failure to enter the program or to maintain the protocol will lead to continued suspension of the medical certificate.

Recidivism. Recidivists will usually be disqualified from holding an aviation medical certificate and will not be considered for further certification.
Reinstatement of Aeromedical Certification

Applicants who are disqualified from holding an aviation medical certificate as a result of problematic use of drugs/substances (including alcohol) may subsequently be certified at any class provided they meet the following requirements:

a. The applicant completes a detoxification program (if relevant to the management of the drug/substance condition—eg, alcoholism)

b. The psychiatrist/drug rehabilitation specialist managing the applicant’s case assesses the applicant and provides a report confirming the applicant’s abstinence and prognosis

c. The applicant enters a program of random drug testing/performance assessment at the direction of CASA to confirm continued abstinence.

d. The applicant enters an appropriate peer support program

e. The applicant is regularly reviewed by a psychiatrist/substance abuse specialist and a report is provided to CASA 6 monthly (in the first year).

Applicants will not usually be granted medical certification within 12 months of diagnosis/disqualification for substance abuse. Applicants who have been treated for alcohol related conditions may be considered for medical certification 4 months after detoxification is complete.

Recidivism

Recidivists will usually be disqualified from holding an aviation medical certificate and will not be considered for further certification.
2.6.9 Schizophrenia and Psychotic Disorders

These disorders are grouped together as they frequently include psychotic symptoms as a prominent aspect of their presentation (“psychotic” refers to an “inability to test reality” as evidenced by the presence of delusions, prominent hallucinations, disorganised speech, disorganised or catatonic behaviour).

An established history of schizophrenia or psychotic disorder is an absolute contraindication to aeromedical certification of pilots and ATCs. Occasionally aircrew who can unequivocally be established to have experienced a temporary psychotic episode which, has ceased and is reasonably expected never to recur (e.g. psychosis secondary to an organic, toxic or metabolic cause) may be considered for certification. In such cases, certification will be based on psychiatric and other expert advice on the risk of recurrence.

Applicants and licence holders rarely inform CASA when they are diagnosed with schizophrenia or other psychotic illnesses. Such individuals may have little insight into their illness and may attempt to continue flying/controlling. DAMEs and other medical practitioners who are aware of a patient who holds a pilot or ATC licence and who is suffering from a psychotic illness should immediately notify CASA’s Aviation Medicine Section and, where appropriate, notify the medical certificate holder that this is being done. While this may be personally difficult, the risk posed to the safety of the public as well as to the individual by a psychotic medical certificate holder or applicant is such that notification of CASA is entirely appropriate. The Civil Aviation Regulations and the Civil Aviation Safety Regulations indemnify any medical practitioner who acts in good faith in such circumstances.
2.6.10 Mood Disorders

**Major Depression**

Major depressive disorder is characterised by a clinical course involving one or more episodes of major depression without a history of manic, mixed or hypomanic episodes. Major depressive disorder may have an extremely variable course with some patients experiencing episodes of severe depression separated by long periods without depressive symptoms of any sort, while other patients are entirely debilitated by their almost unrelenting condition. At least 60% of individuals who have a single episode of severe depression will experience further episodes, and 90% of individuals who have had three episodes of severe depression will have subsequent episodes. A significant aeromedical concern is the high mortality associated with this condition, as up to 15% of patients with major depression die by suicide.

However, major depression is also commonly relatively mild in its manifestation and readily treated. Assessment of the aviation risk is thus problematic and is based on considerations such as the worst state the patient has experienced during an episode and the suicide/homicide risk during their worst state. The presence of a significant risk at any time during the course of a depressive illness will be disqualifying for pilots and ATCs. A specialist psychiatric opinion should be sought in any case where there is uncertainty about patient status.

**Bipolar I Disorder (Mania with/without Major Depression)**

The essential feature of this disorder is a clinical course characterised by the occurrence of one or more manic episodes or mixed episodes. More than 90% of individuals who have an episode of mania will go on to have future episodes. Such individuals frequently suffer one or more episodes of major depression or other psychiatric co-morbidities. Completed suicide occurs in 10-15% of such patients.

Bipolar disorder is disqualifying for pilots and ATCs.

**Bipolar II Disorder (Hypomania with Major Depression)**

The essential feature of this disorder is a clinical course characterised by the occurrence of one or more major depressive episodes accompanied by at least one hypomanic episode.

Bipolar disorder is disqualifying for pilots and ATCs.
Cyclothymic Disorder (Numerous Brief Episodes of Hypomania and Minor Depression)

The essential feature of cyclothymic disorder is a chronic fluctuating mood disturbance involving numerous periods of hypomanic symptoms and numerous episodes of depressive symptoms over a period of years (where neither hypomanic nor depressive symptoms are severe or prolonged enough to meet diagnostic criteria for a manic depressive episode). Cyclothymic disorder usually begins insidiously in adolescence and has a chronic indolent course into adulthood. Approximately 15% of sufferers will subsequently develop Bipolar I or II disorder.

Dysthymic Disorder (Prolonged Minor Depression without Mania/Hypomania)

The essential feature of dysthymic disorder is a chronically depressed mood that occurs on most days for several years. Affected individuals describe themselves as being chronically sad or “down in the dumps”. During periods of depressed mood, additional symptoms of depressed appetite, sleep disturbance, low energy levels, low self-esteem, poor concentration and feelings of helplessness may be present. Up to 75% of patients with dysthymic disorder will develop major depression within 5 years.

Pilots and Air Traffic Controllers with dysthymic disorder will not be certificated while they are symptomatic. On remission of symptoms, successfully treated applicants with a good prognosis may be certificated on the basis of a report from a consultant psychiatrist that indicates that the applicant is in remission and at low risk of behaviour that may compromise aviation safety.
Use of Antidepressant Medication by Depressed Pilots and Air Traffic Controllers

CASA may, on a case-by-case basis, certificate applicants who are prescribed (and are taking) the antidepressant medications Sertraline, Citalopram and Venlafaxine as treatment for their depression. CASA is reviewing the antidepressant Moclobemide for possible approval for use by aviators and ATCs. An “as or with co-pilot” or “with direct air traffic controller supervision” condition, as appropriate, may be imposed. Pilots and ATCs taking other types of anti-depressants will not usually be considered for certification. CASA certification of pilots and ATCs taking CASA authorised medications is conditional on:

- Such applicants being under the care of a medical practitioner experienced in the management of depression—the applicant must:
  - Be stable on an established and appropriate dose of medication for at least four weeks before returning to flying/ATC duties and exhibiting:
    - Minimal acceptable side-effects
    - No drug interactions or allergies
  - Be subject to clinical review monthly or more often, with progress reports to CASA at 6 monthly intervals (for at least the first year). The applicant may be involved in other concurrent treatment (e.g. psychotherapy).
  - Have an absence of other significant psychiatric co-morbidities
  - Have no other psychoactive medications
  - Have precipitating factors removed/controlled.
  - Symptoms of depression being well controlled, without evidence of psychomotor retardation
  - An absence of suicidal ideation or intent
  - An absence of features of arousal (e.g. irritability or anger)
  - The presence of a normal sleep pattern.

Pilots or ATCs authorised to fly or perform duties when taking Selective Serotonin Re-uptake Inhibitor (SSRI) or related antidepressant medications must cease exercising the privileges of their licences if their antidepressant medication is altered or the dose changed. Their supervising medical practitioner may return them to duty when they are assessed as stable and without unacceptable side effects.

Pilots and ATCs whose medication is being reduced must cease exercising the privileges of their licences for the entire period during which they are weaned off medication plus an additional period of two weeks. Their supervising medical practitioner may return them to duty when they are assessed as stable and without unacceptable side effects.
2.6.11 Anxiety Disorders

DSM IV has eliminated the term neurosis, and dispersed the diagnoses from this former category of disorders amongst four other headings:

- Mood disorders
- Anxiety disorders
- Somatoform disorders
- Dissociative disorders.

Because panic attacks and agoraphobia may occur in the context of any anxiety disorder as well as in association with other mental disorders, they are defined separately hereunder.

**Panic attacks**

Panic attacks are discrete episodes in which an individual experiences a sudden onset of intense apprehension, fearfulness or terror, often associated with feelings of impending doom. During these episodes, symptoms such as shortness of breath, palpitations, chest pain or discomfort, choking/smothering sensations, and fear of “going crazy” or losing control may be present. Attacks occur suddenly, may be unpredictable and usually build to a maximum within 10-15 minutes. CASA will not usually grant aeromedical certification to an individual who suffers non-specific or unpredictable panic attacks.

**Agoraphobia**

The essential feature of agoraphobia is extreme anxiety about being in places or situations from which escape may be difficult (or embarrassing) or in which help may not be available in the event of having a panic attack. The anxiety typically leads to a pervasive avoidance of a variety of situations. Such avoidance may impair an individual’s ability to work or to carry out other responsibilities. CASA may grant aeromedical certification where an applicant’s agoraphobia is unrelated to the aviation environment or unlikely to affect aviation safety adversely.

**Specific Phobia**

The essential feature of this disorder is a marked and persistent fear of clearly discernible, circumscribed objects or situations. Exposure to the phobic stimulus almost invariably provokes an immediate anxiety response. CASA may grant aeromedical certification where an applicant’s specific phobia is unrelated to the aviation environment or is unlikely to affect aviation safety adversely.
Social Phobia (Fear of Embarrassment)

This condition is marked by a significant and persistent fear of social or performance situations in which embarrassment may occur. Exposure to such situations almost invariably provokes an immediate anxiety response and may reduce an affected individual’s ability to function in social and occupational circumstances. Most sufferers of this condition avoid these social/performance situations but some may endure such situations with dread. CASA will not usually grant aeromedical certification to an individual who suffers from non-specific or unpredictable social phobias.

Obsessive-compulsive Disorder (Obsessive Thoughts and Compulsive Rituals)

Obsessions are persistent ideas, thoughts, impulses or images that are experienced as intrusive and inappropriate and that cause marked anxiety or distress. Compulsions are repetitive behaviours or mental acts whose goal is to prevent or reduce anxiety or distress. In most cases, an individual with a compulsion feels driven to perform a compulsion to reduce the distress that accompanies the obsession or to prevent some dreaded event or situation. Eventually, the sufferer recognizes that the obsession or compulsion is excessive or unreasonable but feels powerless to prevent it. These disorders may cause marked distress, be extremely time consuming or significantly interfere with an individual’s normal social or occupational circumstances. CASA will not usually grant aeromedical certification to an individual who suffers from obsessive-compulsive disorder.

Post-traumatic Stress Disorder (Non-acute Psychological Consequences of Previous Trauma)

The essential feature of Post-Traumatic Stress Disorder (PTSD) is the development of characteristic symptoms following exposure to an extremely traumatic stressor. Such stressors include a personal near death experience, witnessing the severe injury or death of another or the violent or unexpected death of a family member. An individual’s response must involve intense fear, helplessness, or horror. The characteristic symptoms resulting from exposure to the extreme stressor include persistent re-experiencing of the trauma, avoidance of the stimuli associated with the trauma, numbing of general responsiveness and persistent symptoms of increased arousal. PTSD can occur at any age and symptoms generally begin within 3 months of the precipitating event. CASA will not usually grant aeromedical certification to an individual who is suffering from acute symptoms of PTSD. Certification may be considered once an individual’s symptoms are controlled and the applicant is considered to pose no threat to the safety of air navigation.
2.6 Psychiatry

Acute Stress Disorder

This condition is characterised by the development of anxiety, dissociative or other psychological symptoms within one month of exposure to an extremely traumatic stressor. Generally symptoms of acute stress disorder begin shortly after exposure to the stressor, peak after 2-5 days, and resolve within a month (otherwise the diagnosis should be changed). CASA will not usually grant aeromedical certification while individual is experiencing an acute stress reaction. Once the condition has resolved, return to flying or ATC duties is likely.

Generalised Anxiety Disorder

In this disorder an individual is afflicted by excessive anxiety about a number of events or activities. The symptoms occur on the majority of days and the individual finds it difficult to control the symptoms. The anxiety and worry are accompanied by one of more of the following:

- Restlessness
- Easy fatigability
- Difficulty concentrating
- Irritability
- Muscle tension
- Disturbed sleep.

Many individuals suffering generalised anxiety disorder report they have been nervous and anxious all of their lives. The clinical course is chronic and fluctuating. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.
2.6.12 Somatoform Disorders

The common feature of this group of disorders is the presence of physical symptoms that suggest an underlying physical condition, but are not explained by that medical condition. The symptoms cause clinically significant distress or impairment in social, occupational or other areas of functioning and are not intentional.

**Somatization Disorder**

In somatization disorder, the patient experiences multiple symptoms including pain, gastrointestinal symptoms, sexual dysfunction and pseudo-neurological symptoms over several years. Characteristically, this disorder begins before the age of 30 and has a chronic fluctuating course that rarely remits completely. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Undifferentiated Somatoform Disorder**

The essential feature of this disorder is the presence of one or more physical complaints that persist for six months or longer. Symptoms include chronic fatigue, loss of appetite, gastrointestinal or genitourinary symptoms. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Conversion Disorder**

This disorder involves unexplained symptoms or deficits affecting voluntary motor or sensory function suggesting a neurological or other general medical condition. Psychological factors are judged to be associated with the symptoms or deficits. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Pain Disorder**

In pain disorder, the predominant focus of clinical attention is pain. Psychological factors have an important role in the severity, exacerbation or maintenance of this disorder. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Hypochondriasis**

This condition is the preoccupation with the fear of having, or the idea that one has, a serious disease based on a patient’s misinterpretation of bodily symptoms or functions. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.
**Body Dysmorphic Disorder**

This condition is the preoccupation with an imagined or exaggerated defect in physical appearance (in contrast to anorexia and bulimia where the morbid focus is on body weight). CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

### 2.6.13 Factitious Disorders

Factitious disorders are characterised by physical or psychological symptoms that are intentionally produced or feigned in order to assume a “sick role”. In contrast to malingering, the motivation of sufferers of factitious disorders is psychological and there is an absence of external incentive for the behaviour. Other psychiatric co-morbidities are frequently present. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

### 2.6.14 Dissociative Disorders

The essential feature of this group of disorders is a disruption in the integrated functions of consciousness, memory, identity or perception. The disturbance may be sudden or gradual in onset, and may be transient or chronic. Dissociative amnesia, dissociative fugue, dissociative identity disorder, and depersonalisation disorder are included in this group of disorders. CASA will not usually grant aeromedical certification to an individual who suffers from these conditions. Aeromedical certification may be considered should the condition resolve.
2.6.15 Sexual and Gender Identity Disorders

Sexual Dysfunctions

This group of disorders is characterised by disturbance in sexual desire and in the psychophysiological changes that characterise the normal human sexual response. They may cause marked distress and interpersonal difficulty. In general, these disorders are not of aeromedical concern unless the associated psychological distress intrudes on an individual’s ability safely to control and aircraft or perform duty as an ATC.

Paraphiliias

The essential feature of this group of conditions is recurrent, intense, sexually arousing fantasies, sexual urges or behaviours involving non-human objects, the suffering of oneself/others, or the non-consensual participation of others in such activities. Affected individuals are rarely self referred and usually come to attention when their behaviour has brought them into conflict with their sexual partners, society, or has reduced on their social, occupational or other areas of functioning.

Affected applicants will not usually be aeromedically certificated until the issues that brought them to attention have been resolved. Successfully treated applicants with a good prognosis may be certificated on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.

Gender Identity Disorders

Patients with gender identity disorder experience strong and persistent cross-gender identification and a persistent discomfort about their assigned sex. The diagnosis depends on evidence of clinically significant distress or impairment in social, occupational or other areas of functioning.

Affected applicants will not usually be aeromedically certificated until the source of the distress or impairment is dealt with, and if appropriate, gender reassignment has been completed. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.
2.6.16 Eating Disorders

Anorexia Nervosa

The essential features of this condition are refusal to maintain a minimally normal body weight, intense fear of gaining weight, and significant disturbance in perception of shape/size of the body. Restrictive and binging/purging subtypes of this condition are identified. Many persons with anorexia nervosa exhibit depressive symptoms, others may be obsessive-compulsive, while others may have feelings of ineffectiveness, a strong desire to control the environment, inflexible thinking, limited social spontaneity, perfectionism, restrained initiative and depressed emotional expression. While some persons recover from anorexia completely, others have a relapsing course and the overall mortality of this condition approaches 10%.

CASA will not usually aeromedically certificate applicants who are actively anorexic. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.

Bulimia Nervosa

The essential features of this condition are binge eating and use of inappropriate compensatory methods to prevent weight gain. Persons with bulimia also place an excessive emphasis on their body shape. They are frequently depressed or suffer mood disorders and many also meet the criteria for the diagnosis of personality disorder. The lifetime prevalence of substance abuse disorders involving alcohol or stimulants is at least 30% among persons with bulimia.

CASA will not usually aeromedically certificate applicants while they are actively bulimic. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.
2.6.17 Sleep Disorders

Primary Sleep Disorders

This group of disorders includes the dyssomnias (including insomnia, hypersomnia and narcolepsy which are characterised by abnormalities in the amount, quality or timing of sleep) and the parasomnias (characterised by abnormal behavioural or physiological events occurring in association with sleep). Of primary aeromedical concern is the failure of sufferers from these conditions to gain sufficient restorative sleep to ensure optimum alertness and cognitive function when performing duties as pilots and ATCs. Applicants for aeromedical certification will only be considered if studies confirm normal alertness during waking hours (with or without treatment). (Also see Section 2.3 Medical Aspects – Respiratory Disease.)

2.6.18 Impulse Control Disorders

The essential feature of impulse control disorders is failure to resist an impulse, drive, or temptation to perform an act that is harmful to the person or to others. CASA will not usually grant aeromedical certification to individuals who are diagnosed as suffering from such disorders.
2.6.19 Adjustment Disorders

An adjustment disorder may be identified when a person, within three months of an event or stress, develops clinically significant emotional or behavioural symptoms. Such symptoms are either greater than would be generally expected, given the nature of the stressor, or lead to significant impairment in social, educational or occupational function. Stressors may be single or multiple, recurrent or continuous, and may affect either a single person or a group. Patients with adjustment disorders may experience symptoms of depression, anxiety, or may manifest disturbances of conduct. Adjustment disorders generally have a good prognosis and usually remit within six months of the stressor or its consequences ceasing.

Pilots or ATCs should not exercise the privileges of a licence whilst suffering symptoms of an acute adjustment disorder. In some cases, a medical certificate may be suspended. Once psychiatric opinion confirms that the symptoms associated with the adjustment reaction have abated and the acute stressor has been removed or overcome, CASA will usually issue an unrestricted medical certificate.

Personality Disorders

Personality disorders are characterised by enduring patterns of thought and behaviour that deviate markedly from the expectations of a person’s culture. These patterns, which usually begin in adolescence or early childhood, are pervasive, frequently inflexible, stable over time and cause distress, social impairment and often occupational difficulties. A number of specific personality disorders are identified including: antisocial personality disorder; (impulsive, aggressive, manipulative); borderline personality disorder (impulsive, self-destructive; unstable), dependent personality disorder (dependent, submissive, clinging); Histrionic personality disorder (emotional, dramatic, theatrical); narcissistic personality disorder (boastful, egotistical, "superiority complex"); obsessive-compulsive personality disorder (perfectionist, rigid, controlling); paranoid personality disorder (suspicious, distrustful); and, schizoid personality disorder (socially distant, detached), etc.

While personality traits are unique and may enable a person to excel in a particular field, individuals with identifiable personality disorders are likely to have attitudes or perform acts that may be prejudicial to flight safety. Such individuals fail to meet CASA’s psychiatric medical standards and will usually be disqualified from aeromedical certification. Certification may be considered if specialist psychiatric opinion confirms that a pilot or ATC with a personality disorder represents a low risk to aviation safety.
2.6.20 Other Psychiatric Conditions which may be the Focus of Clinical Attention

**Suicidal Ideation or Gesture**

Suicide and attempted suicide are not psychiatric diagnoses per se, but rather symptoms of underlying psychiatric disease. Furthermore, it is uncommon for an individual to use an aircraft as a means of committing suicide.

Those who commit suicide are more often male. The act is carefully planned, precautions taken against discovery, and the method is often violent. The majority of those who suicides are suffering from a depressive disorder, many having significant social problems, and alcohol misuse is a feature in about 15% of cases. In the younger age groups personality disorders are frequently diagnosed, because they are often associated with alcohol or drug misuse, and adverse social factors. Deliberate self-harm is usually an impulsive act, committed in such a way as to invite discovery. Over dosage with minor tranquilisers, antidepressants and non-opiate analgesics is common. Frank major psychiatric illness is uncommon.

In assessing potential risk the following factors should be considered:

- A history of direct statement of intent
- A history of previous self harm
- A previous or current depressive disorder, particularly in the early phase of recovery
- Alcohol dependence, particularly with severe physical or social complications
- Drug dependence
- Social deprivation or loneliness.

Certification may be considered if specialist psychiatric opinion confirms that a pilot or ATC who has attempted or considered suicide represents a low risk to aviation safety. Applicants who have a history of multiple suicide attempts will not usually be granted a medical certificate.
Fear of Flying

DSM IV identifies as a true simple phobia the overt, unabashed, and long-standing fear of flying which usually occurs in people who are not aviators. When an experienced aviator who previously enjoyed flying presents with “fear of flying” it may represent a complex mix of more acute causes and symptoms’ presentations. In such fearful fliers, anxiety about symbolic threats may overlay a rational fear of actual risks; this may represent a reaction to a near or actual accident, or displaced anxiety from a personal crisis. If the flier is not consciously aware of the fear, the focus may be on vague or trivial somatic symptoms, presented in a setting of "I'd like to fly, but—." This attitude presents a striking clinical contrast to the more usual tendency of fliers to understate, if not actually deny, signs and symptoms that they believe may disqualify them from medical certification.

An episode of spatial disorientation or of hyperventilation in flight may trigger intense symptoms of anxiety. Loss of motivation to fly may undermine previously adequate means of coping with the true dangers of flight, particularly in professional aviators. An accident involving the flier or a friend may overwhelm mental defences against such a possibility. Interpersonal conflicts with significant individuals in a non-aviation setting (home, office) may precipitate aviation-related anxieties without any obvious connection to flying except the time of onset.

Whatever its genesis, CASA will not medically certificate a pilot who suffers symptomatic fear of flying until its causes are delineated and the fear has been successfully treated.
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2.7.1 Introduction

This section details the assessment of pilots, other aircrew members and Air Traffic Controllers (ATC) who suffers or who may suffer from renal disease or from urological disorders.

The aim of the renal assessment within the aeromedical examination is to ensure that applicants do not suffer from renal or urological conditions which place them at an increased risk of incapacitation or which may produce a decrement in physiological or psychological function sufficient to jeopardise the safety of air navigation. In conducting the aeromedical examination, the DAME will recognise that an individual who holds an unrestricted medical certificate must be capable of performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities may include flight (either as a private or professional pilot):

- For prolonged duration, often as part of a shift roster
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning, and
- Subject to disrupted sleep and time zone changes.

A number of these stressors may also affect ATCs.
2.7.2 Urinary Standard – CASR Part 67

The urinary standards are found in the following paragraphs of CASR Part 67:

| CASR 67 | For medical standard 1 | CASR 67.150(7)  
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| CASR 67.155 | For medical standard 2 | CASR 67.155(7)  
| Table 67.155 | 2.18 – 2.21 |
| CASR 67.160 | For medical standard 3 | CASR 67.160(7)  
| Table 67.160 | 3.17 – 3.20 |

2.7.3 Dipstick Testing

Haematuria

Urinary ‘dipstick’ testing is required as part of the routine aeromedical examination to screen for the presence of haematuria. Approximately 2-5% of the population have microscopic haematuria, but only about 0.5% who are under age 70 will have a urinary tract cancer as the cause. A positive dipstick test should be repeated, and if negative, managed expectantly. (Most of these applicants will have a minor glomerular lesion.)

Initial aeromedical management of an applicant with a persistently positive dipstick test involves obtaining phase contrast microscopy of a fresh mid-stream urine sample. The sample must be examined within two hours of being passed; thus individuals more than two hours from a suitable pathology service must travel to a location that has that capability. Because of wide variation between laboratories in reporting urine abnormalities, CASA’s relevant requirement for a ‘normal’ assessment in an applicant found to have microscopic haematuria is for three separate urine tests, all of which have less than 20,000 RBC per ml. Phase contrast microscopy of specimens with crenated cells up to 10,000 per ml, indicating a glomerular origin, are considered to be within normal limits. Cells with a ‘non-glomerular’ appearance are likely to indicate a urothelial problem.

Where there is ‘significant haematuria’ (more than 20,000 RBC per ml in any test), initial urogenital imaging is to be by Ultrasound or Intravenous Pyelogram (IVP), as some 10% of all stones are radiolucent. The requirement for further investigation should be determined on clinical grounds and on the basis of investigation results.
Proteinuria

Orthostatic proteinuria can be excluded by testing an early morning urine specimen. If an early morning specimen remains positive for protein, then a 24-hour urine protein estimation is required. Normal is <150mg protein/day.

2.7.4 Urinary Calculi

There have been no reported episodes of incapacitation involving CASA certificate holders with a known history of renal calculi. However, there have been several untoward incidents as a result of undiagnosed or unreported stone. The aviation environment may predispose aircrew to stone formation due to the low humidity environment often found in aircraft cockpits, and because of a tendency for some pilots deliberately to under-hydrate to avoid the need to urinate, particularly where there is no toilet on the aircraft.

The presence of any stone or stones in the urinary system is aeromedically significant. (For CASA certification purposes, there is no such entity as an asymptomatic stone). Renal stones as small as 1-2 mm diameter can and do cause significant symptoms. There are no reliable prognostic indicators that can determine if a stone will or will not cause symptoms, and the chance of a stone present for 10 years moving in the subsequent 24 hours is the same as it moving after being present for 10 days. The time a stone has been present is not a reliable indicator of risk.

Single Renal Stone (Passed or Removed)

In applicants who have had a single episode of renal colic, about 50% will have a repeat episode within 5-7 years, and nearly 100% within 12-15 years, unless they modify their behaviour. However, for applicants who have passed all stones or had them removed and who are able to maintain adequate urine flow (>2 litres/day), the risk of stone recurrence is the same as for the general population. Thus CASA will certificate pilots and ATCs who have experienced a single episode of renal stone disease, with successful removal or passage of the stone. In such cases, the only surveillance need be by urine dipstick at routine CASA medical examinations.

Recurrent Renal Stones (Passed or Removed)

Pilots and ATCs who have experienced recurrent episodes of renal stone disease may be recertificated once they are proven to be free of all stones in the kidney or renal tract, have normal renal function and have adopted appropriate risk minimisation behaviour. CASA will require the following annual investigations and reports in these cases:

- Plain abdominal X-ray or ultrasound
- 24-hour urine calcium and urate estimations
- Urological review.
Retained Renal Stones

Where stone material remains in the renal substance or urinary tract, CASA will not permit unrestricted Class 1 or Class 3 certification unless there are clear mitigating factors that preclude renal colic, such as a staghorn calculus, a calculus in a diverticulum, or a stone clearly embedded in the renal substance. (Further stone movement is extremely unlikely in such cases.) Pilots or ATCs with staghorn calculi may be suitable for certification, on a case-by-case basis, until stone removal, provided they are asymptomatic, their renal function is normal, and movement of the calculus is considered unlikely. CASA may entertain unrestricted certification for Class 2 applicants in similar circumstances, on a case-by-case basis, and subject to annual urological review.

Approximately 20% of patients will have residual calculi three months after undergoing Extracorporeal Shockwave Lithotripsy (ESWL). Where there is a small stone or remnant following attempted removal with ESWL, generally accepted management is to leave the stone alone. However, due to the risk of inflight incapacitation with residual stone fragment movement, it may be worthwhile to offer removal of stone remnants via flexible ureteroscopy. There is currently an approximate 50% success with this procedure, but its risks include urine extravasation, which can be extremely painful. Percutaneous nephrolithotomy (PCNL) may be a better option for pilots to ensure a stone free status.

2.7.5 Medullary Sponge Kidney

Persons with medullary sponge kidneys (MSK) tend to be chronic renal stone formers. Therefore, most applicants for pilot or ATC certification who have MSK will not be issued an aviation medical certificate of any kind. However, CASA may certificate pilots or ATCs with this condition, on a case-by-case basis, if they have a history of one episode of renal colic or fewer, and if there are no residual stones demonstrated on investigation. (Beware of the applicant with only a radiological diagnosis of MSK and no history of stones or calcification. Many such persons have only a prominent medullary blush with no adverse implications for aeromedical certification.)
2.7.6 Glomerulonephritis

**Thin Membrane Disease**

Thin membrane disease (TMB) is due to a type IV collagen genetic defect and occurs predominantly in females. It has no major health implications and is considered benign for the purpose of CASA aeromedical certification. Patients with TMB often have an incidental finding of 80,000-100,000 RBC per ml of urine, but further investigation reveals no other abnormalities. If blood pressure is normal and renal function tests are normal (including 24-hour urinary protein excretion and 24-hour creatinine clearance), CASA will accept a presumptive diagnosis of TMB and will not require further investigation. While biopsy may be offered to confirm the diagnosis of TMB, such an investigation is not required for aeromedical certification.

Where TMB is confirmed by biopsy, there is no requirement for any surveillance. In the case of a presumptive diagnosis, the result of a serum creatinine study is required with every subsequent CASA medical examination.

**IgA Nephropathy**

This condition was formerly considered to be benign, but it is now clear that it may later lead to renal failure in some persons. Risk of disease progression is greater when it is associated with hypertension, abnormal renal function test results and renal scarring, detected on biopsy. In the absence of such abnormalities, the risk of renal failure in cases of IgA nephropathy is about 1% after 20 years. The condition is of aeromedical concern because of the risk associated with subtle incapacitation due to circulating toxins produced as renal failure progresses. Rapid progression to nephrotic syndrome may also occur. CASA will usually certificate pilots and ATCs who are affected by IgA nephropathy. Required surveillance measures are:

- 24-hour urine protein estimations
- Serum albumin testing
- Renal function testing.

All of these tests are to be done at six-monthly intervals.
2.7.7 Nephrotic Syndrome

Many persons affected by this condition recover spontaneously, while others respond well to treatment with steroids. If immunosuppression is necessary for treatment, pilots and ATCs may not exercise the privileges of their licences until treatment is complete. CASA will consider recertification once the condition has resolved, medication has been ceased and renal function has returned to an acceptable level (defined as protein excretion <3g per day).

2.7.8 Renal Failure

For aeromedical certification purposes, renal failure is defined by biochemical markers of impaired renal function. Physical symptoms of renal failure occur late in this disease and represent manifestations of severe end stage renal failure.

The main marker of renal function is the serum creatinine level. Most persons with chronic renal impairment who have a creatinine level <200 micromol/L suffer no untoward effects. (However, DAMEs should recall that a creatinine level <200 micromol/L may evoke severe symptoms in cases of acute renal impairment). Where an applicant’s creatinine level is between 200 and 500 micromol/L, the DAME’s clinical acumen will be required to determine fitness for exercise of licence privileges. A creatinine above 500 micromol/L invariably produces untoward health effects, including:

- Slowed mentation
- Poor concentration
- Lethargy
- Gastrointestinal disturbance
- Other electrolyte disturbances
- Rapid deterioration with intercurrent illness.
Aeromedical Disposition

When there are three test results of >500 micromol/L creatinine, the DAME should advise the applicant not to exercise the privileges of his/her licence and inform CASA of the details. Following a single initial test result of >500 micromol/L creatinine, the certificate holder should be advised not to exercise privileges, and a further test arranged for 48 hours later. If the second test confirms the original result, a third test is required 48 hours later again. The DAME should inform CASA Aviation Medicine Section of the results, and CASA will usually suspend the applicant’s medical certificate. For reported creatinine levels between 200-500 micromol/L, the DAME will consider the possible effect on safe aviation of symptoms such as those listed above, and either advise the applicant accordingly or discuss the matter with CASA Aviation Medicine Section.

Acute renal impairment is usually associated with a significant insult which itself precludes a medical certificate holder from flying or controlling. Once recovered from the precipitating cause of acute renal failure, CASA will consider recertification on a case-by-case basis.

Renal Dialysis

Persons undergoing renal dialysis usually have significantly high creatinine levels, even soon after completing a dialysis session. Their electrolyte levels may be abnormal because of large fluid shifts that accompany dialysis. Consequently, persons undergoing renal dialysis may remain symptomatic for several hours following dialysis. CASA will not usually certificate pilots or ATCs with chronic renal failure who are undergoing dialysis (of any type). Very well controlled pilots and ATCs may be granted special certification, on a case-by-case basis, permitting exercise of privileges in the period between 12 and 36 hours (only) following a dialysis.

Renal Transplant

Following renal transplantation, most recipients receive immunosuppressants to prevent tissue rejection. They have increased risks of hypertension and of ischaemic heart disease, also of developing carcinoma. Some transplant recipients have minimal complications and normal renal function. CASA will not consider aeromedical certification for pilots or ATCs until 12 months following transplantation. If the applicant is then receiving standard immunosuppressant therapy, has well controlled blood pressure, and renal function is at an acceptable level, CASA, may consider recertification, on a case-by-case basis.
2.7.9 Single Kidney

If an applicant has a single kidney and this condition is developmental, renal function testing should be undertaken. If this is normal, aeromedical certification will be unaffected. If an applicant has a single kidney due to nephrectomy, the cause of the kidney's removal must also be considered. If the underlying cause does not affect certification, then the same considerations of renal function testing and aeromedical disposition apply as for developmental variations.

2.7.10 Urinary Tract Infections

Female

In the young adult female, isolated urinary tract infection (UTI) is common. Investigation rarely reveals a specific cause. A small percentage of women will develop chronic or recurrent UTIs. They require investigation (including IVP) to exclude underlying anatomical causes. Some of them may need antibiotic cover for extended periods and/or post coital antibiotic prophylaxis. Female applicants receiving antibiotic treatment for recurrent UTIs are unlikely to adversely affect the safety of air navigation, and there need be no restrictions on their aeromedical certification.

Male

A UTI in a male usually indicates the presence of an anatomical abnormality in the urinary tract. The diagnostic yield from investigations is about 50%. Adequate investigation must include IVP and cystoscopy. Future aeromedical certification will depend on the findings from investigations.

2.7.11 Prostatitis

Acute bacterial prostatitis should be managed as an acute intercurrent illness (like UTI) and the pilot or ATC returned to duty only when fully recovered. Non-bacterial or chronic prostatitis is considered to be a form of pelvic pain syndrome, often accompanied by significant psychological overlay, analogous to the findings in Irritable Bowel Syndrome. Chronic prostatitis is often distracting and may be difficult to manage. Best pharmacological management is with anti-inflammatory and/or anti-depressant medications. CASA will determine future aeromedical certification of affected applicants on a case-by-case basis. The DAME should closely assess the psychological status of any affected pilot or ATC before making a recommendation concerning aeromedical disposition.
2.7.12 Urinary Outflow Obstruction

Benign prostatic hypertrophy (BPH) is the commonest cause of outflow obstruction in Australian males. Acute urine retention occurs in persons affected by BPH at the rate of 5-8% per annum. There is also a small risk of chronic incapacitation due to reduced renal function.

An acute retention episode may be treated by surgery, or by use of an alpha-blocker medication. Successful surgery will usually result in clearance to return to flying or controlling as soon as the applicant has fully recovered from the effects of the surgery. Note that alpha blockers may reduce G-tolerance—the more specific the drug, the better tolerated. Tamsulosin or alfalfusin are highly selective, but are seldom prescribed in Australia as they are not currently listed on the PBS. Prazosin is listed on the PBS, but is less selective than other available agents and has more side effects. Prazosin use is not compatible with agricultural or aerobatic flying, and medical certification for pilot applicants using it will contain appropriate restrictions.

2.7.13 Testicular Cancers

Also see Section 2.14, Malignancy.

Teratoma

The progress or recurrence of teratomas may be determined by use of an appropriate marker. Chemotherapy is the usual treatment and there is >90% cure rate. When the applicant has a stage A tumour and markers are normal, early return to duty may be possible. For stage B tumours, where adequate treatment requires 3-4 cycles of chemotherapy, return to duty will be delayed until at least three months after completion of chemotherapy. All such cases should be referred to CASA Aviation Medicine Section for determination of aeromedical disposition.

Seminoma

Seminomas are very sensitive to radiation, and a very low radiation dose may be curative. As there is no reliable marker available at present, surveillance can be difficult. Once treatment is complete, early return to duty may be possible. All such cases should be referred to CASA Aviation Medicine Section for determination of aeromedical disposition.
2.7.14 Prostatic Carcinoma

Prostate Specific Antigen (PSA) is a very reliable marker for progress of established prostatic cancer. However, it is unreliable as a screening test and there is still no normal range defined for it. Risk of prostate cancer against PSA may be graphed, and most laboratories recommend further investigation when a PSA is >4, but positive predictive value is poor at this level. Once PSA reaches 12, the PPV is close to 1.

In established disease, the PSA is a proxy measure of prostate bulk and of cell turnover. PSA levels >50 are associated with a significant risk of pathological fractures, cerebral and other metastases. However, applicants with prostate cancer and a PSA of <30 have a positive bone scan in <1% of cases. An applicant with PSA of <20 will have cancer mass of only a few grams, while a PSA <12 is not associated with significant risk of metastases.

Aeromedical Certification

Post-radical prostatectomy, if the operation has been successful, PSA should fall to undetectable level. If the level remains undetectable at three years post surgery, there is <5% chance of recurrence of disease. In such circumstances, applicants can be considered cured after four years. Radiotherapy now produces similar outcomes and if PSA remains at nadir levels for 3-4 years following radiotherapy, a similar assessment may be made. Usually, certification for all classes of medical certificate may be possible 3-4 months post surgery or after completion of radiotherapy. CASA will require annual follow up urological reports and PSA estimations. However, if the PSA remains undetectable five years after surgery, no further reports will be required.

Pilots and ATCs with advanced prostatic cancer and PSA >30 must also undergo bone scan as part of their required investigations. CASA will usually only contemplate certification for this group on the basis of ‘as-or-with co-pilot’ or ‘as-or-with second controller only’.

Treatment with anti-androgen therapy produces significant side effects in about 10-20% of cases, particularly lethargy. LHRH agonists may rarely cause a chronic confusional state. Prior to return to duties, an applicant receiving anti-androgen therapy will require an operational check. (Also see Section 2.13, Medication – Drugs and Flying / Controlling.)
2.7.15 Renal Cell Carcinoma

Cerebral spread from a renal cell carcinoma is highly likely. Previously, this cancer has usually been detected late, and affected persons have had poor survival rates. However, recently these tumours have often been detected incidentally by ultrasound. 80% of these tumours are now <5cm in diameter when found, and five-year survival in those affected persons is >90% following treatment. Even for larger tumours (<10cm), five-year survival is >70% following treatment.

Aeromedical certification

As the outcome of renal cancer is unpredictable, and as cerebral metastases are common, CASA will determine aeromedical disposition of pilots and ATCs with this condition on a case-by-case basis. If granted, initial certification is likely to be ‘as-or-with co-pilot’ or ‘as-or-with second controller only’. Certification will not be granted until at least six months following completion of treatment. Unrestricted class 1 certification will not be considered until at least three years post treatment. Class 2 applicants will be considered for unrestricted certification after two years, and Class 3 applicants after one year. CASA requires follow up investigations as follows:

- Six-monthly CT scans for Class 1 applicants
- Annual CT scans for class 2 and 3 applicants.

In all cases, additional investigations must include Full Blood Examination (to exclude polycythaemia), Liver Function Tests, and Urea and Electrolyte estimations.

After 10 years without recurrence of tumour following treatment, an applicant may be deemed ‘cured’. Thereafter, no additional surveillance measures will be required.
2.7.16 Polycystic Kidneys

Polycystic kidneys (PCK) may be associated with several complications that could adversely affect the safety of air navigation. These include acute pyelonephritis, haemorrhage into cysts, renal stones, berry aneurysms and cardiac valvular disease. However, most persons with polycystic kidneys do not experience these complications. The commonest side effect of the condition is hypertension, usually readily controlled by medication. Due to the statistical association of polycystic kidneys with berry aneurysm, all applicants with known PCK must provide the result of a recent Magnetic Resonance Angiogram (performed within 12 months). If this is normal, CASA will usually approve medical certification. However, the test must be repeated and results provided to CASA at intervals of five years while medical certification is maintained. If the DAME detects any cardiac murmur when examining an applicant with PCK, CASA requires an echocardiogram and report for initial certification. This is also the case when any new murmur is noted.

2.7.17 Amyloid

This is a systemic disease with possible renal, neuropathic and cardiological manifestations. On diagnosis of the condition, inform CASA Aviation Medicine Section and advise the applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA. Following appropriate investigations, CASA will determine aeromedical disposition on a case-by-case basis.
2.8 Gynaecology and Obstetrics

2.8.1 Gynaecological and Obstetric Standard – CASR Part 67

The gynaecological and obstetric standards are found in the following paragraphs of CASR Part 67:

- **CASR 67.150** For medical standard 1
  - CASR 67.150(7) Table 67.150 1.23 – 1.24
- **CASR 67.155** For medical standard 2
  - CASR 67.155(7) Table 67.155 2.22 – 2.23
- **CASR 67.160** For medical standard 3
  - CASR 67.160(7) Table 67.160 3.21 – 3.22

2.8.2 Severe Menstrual Disturbances

Applicants with a history of severe menstrual disturbances resistant to treatment must be assessed with caution. Such applicants are likely to be unacceptable for issue of a Class 1 or Class 3 Medical Certificate.

2.8.3 Pregnancy

Pregnancy, particularly during the final trimester, is a cause of temporary unfitness to exercise the privileges of all aviation licences. However, where the obstetrician or other medical practitioner supervising the pregnancy certifies that an applicant or medical certificate holder has no significant medical contraindications related to the pregnancy, she may be assessed as meeting the appropriate medical standard(s). The exercise of licence privileges in such circumstances may involve imposition of appropriate, individually determined operational restrictions.

The risk of acute incapacitation from premature labour exceeds 1% after 30 weeks gestation. Consequently, all medical certificate holders are advised not to exercise licence privileges after 30 weeks gestation.

Class 1 and 2 medical certificate holders are formally deemed medically unfit to exercise licence privileges from 30 weeks gestation until cleared by a post-partum assessment conducted in accordance with the last paragraph in this section.
Class 3 medical certificate holders may exercise relevant licence privileges until 34 weeks gestation provided that:

i. The obstetrician or other medical practitioner supervising the pregnancy certifies that the licence holder is fit for duties during this period; and

ii. Suitable administrative arrangements are made which ensure that sudden incapacitation of an affected licence holder due to premature labour will not adversely affect the safety of air navigation.

Thereafter, Class 3 medical certificate holders also are formally deemed medically unfit to exercise licence privileges until cleared by a post-partum assessment conducted in accordance with the following paragraph.

Following delivery, applicants are required to obtain a clearance from a DAME before once again exercising the privileges of an aviation licence. Depending on the stage of a pregnancy at which the event occurs, such clearance may also be required following a miscarriage, stillbirth or termination of pregnancy. Pregnancy is considered a medically significant condition and DAMEs should remind pregnant applicants of their obligations under CASRs to refrain from exercising their licence privileges until medically cleared. (See also 1.4.5 Temporary Incapacity of Certificate Holders.) Following a normal delivery, clearance to resume flying duties should be appropriate at six weeks post-partum.
2.9 Gastroenterology

2.9.1 Introduction

There is a very wide range of conditions of the gastrointestinal tract and associated organs that may have aviation safety implications. The greater majority are compatible with certification after appropriate assessment and management. This section provides guidance on common conditions of the gastrointestinal tract, liver and pancreas that may be presented to a DAME. It does not cover GI malignancy. All malignancy related advice is addressed in the Section 2.14 Malignancy of this handbook.

2.9.2 Alimentary System Standard – CASR Part 67

CASR 67 The alimentary system standards are found in the following paragraphs of CASR Part 67:

CASR 67.150 For medical standard 1 CASR 67.150(7), Table 67.150 1.14
CASR 67.155 For medical standard 2 CASR 67.155(7), Table 67.155 2.13
CASR 67.160 For medical standard 3 CASR 67.160(7), Table 67.160 3.13

2.9.3 Gastro-Oesophageal Reflux Disease (GORD)

GORD is a very common condition. GORD and Irritable Bowel Syndrome are the two most common GI diagnoses in the Australian pilot population. Underlying pathology that is severe or progressive is unlikely. However, the possibility of cardiological cause of the symptoms should always be borne in mind, particularly where there is resistance to treatment. Where there is chest pain with uncertain aetiology, it is imperative to exclude a cardiac cause before moving to GI or other systems.

Around 50% of all patients diagnosed with GORD have no findings on endoscopy. This is often described as nervous or non-ulcer dyspepsia (NUD) but in reality this is endoscopy negative symptomatic gastro-oesophageal reflux that might be revealed by other techniques, such as oesophageal pH monitoring. NUD refers to symptoms that occur in a group of people without endoscopic or physiological evidence of an acid-peptic complaint. These people usually have a limited or zero response to acid suppressing medication.
Treatment can commence based on symptoms and endoscopy conducted, when response to treatment is poor, "alarm" symptoms occur (eg bleeding, dysphagia) or long term treatment appears to be indicated. Medication is generally very successful, especially with the development of Acid/Proton Pump Inhibitors (PPIs). These drugs have a low side effect profile. Bleeding from reflux oesophagitis while on PPIs is very rare. In theory, intense gastric acid suppression by PPIs may increase susceptibility to gastrointestinal infection, as the internal environment of the stomach is less hostile to ingested organisms. Those who have been treated and are symptom free are generally suitable for certification. Where there are persisting symptoms, treatment should continue, with regular reviews. High-risk ‘alarm’ symptoms such as dysphagia indicate endoscopy. After short term treatment symptoms may return, sometimes with a rebound effect after stopping a PPI. Ongoing treatment may be indicated. However, 'on demand' treatment is becoming more popular. This should not present difficulties with aviation duties.

Selective Serotonin Reuptake Inhibitors (SSRIs) are fairly commonly prescribed along with PPIs for non-ulcer dyspepsia. This is not a risk in itself, but caution is required with the use of SSRIs. Refer to the Section 2.6 Psychiatry in this handbook. Cisapride and SSRIs have a risk of cardiac arrhythmia. Treatment with cisapride is mostly limited to treatment of gastroparesis and therefore cisapride is likely to be withdrawn from the Australian market.

Other medications that may be used include H₂ receptor antagonists. There is some sedation associated with these medications, and a ground trial period is advised. Metaclopramide may on occasions alter the level of consciousness and should not be used for ongoing treatment.

**Barrett’s Oesophagus**

- **Long Segment**: Second-yearly endoscopy will generally be required.
- **Short Segment**: Five-yearly endoscopy will generally be required but current approaches vary.

### 2.9.4 Peptic Ulcer Disease

Management of peptic ulcer disease (PUD) has changed comprehensively following the identification of helicobacter pylori as the most common cause of ulcers. The vast majority of peptic ulcer disease is now known to be due to helicobacter or NSAIDs. Smoking is a further independent risk factor. PUD may be ‘silent’ and not cause symptoms but the risk of a sudden acute bleed in an asymptomatic person is small. “Silent” ulcers are more common and more likely to cause morbidity in those taking NSAIDs including COX-2 inhibitors.
Duodenal PUD

Symptomatic PUD with helicobacter pylori. With the onset of symptoms, the DAME should impose a period of no flying or controlling. In this case, there is a requirement to undertake clearance of the infection prior to return to flying. A negative urea breath test is usually taken to be definitive proof of clearance when performed around two months after treatment. Where the DAME is satisfied that that symptoms have resolved and there will be compliance with the rest of the treatment, there may be a return to flying or controlling. Such return must be on the understanding that evidence of clearance of infection is required within three months of completing treatment. Definitive proof of clearance is usually currently obtained by a urea breath test around two months after treatment. A period of at least seven days off PPIs is necessary prior to the test. Should the infection still be present, the risk of recurrence of symptoms is high (around 80% in the first year). Failed eradication usually indicates the need for further treatment. Without eradication after the follow up test, further treatment is required. Where this second attempt at clearance is unsuccessful, the pilot or controller will usually be grounded until eradication is proven. Where there is symptomatic duodenal PUD only without complication, there is no requirement for a second endoscopy to prove ulcer healing. Once eradication has occurred, the lifetime risk of recurrence is only around 3 to 5%.

Symptomatic PUD without helicobacter pylori. The cause of the PUD needs to be identified and corrected. This is most commonly NSAIDs. The usual treatment for the ulcer in this case is a PPI for around six to eight weeks.

Complicated duodenal PUD. Where there are complications of PUD such as bleeding or perforation the pilot should be grounded during treatment. Endoscopic proof of ulcer healing will usually be required prior to clearance to return to flying or controlling. Approximately 80% of all ulcers are healed after one month. Therefore, the second endoscopy is best scheduled for around this time. Furthermore, when helicobacter infection has been detected and treated, proof of clearance will be required either by a urea breath test or endoscopic gastric biopsies for rapid urea testing (eg CLO/HUT tests) or histology.

Chronic duodenal ulcer without eradication of Helicobacter pylori. Consideration will be given to certification of pilots or controllers who have not eradicated Helicobacter pylori, either due to not undertaking eradication or failure of the eradication. Applicants must be on long-term maintenance therapy with a proton pump inhibitor and without symptoms.

Gastric Ulcer

Gastric ulcers should be treated in a similar way to complicated duodenal ulcers. A second endoscopy, usually at one month after beginning treatment, is required to demonstrate healing of the ulcer prior to consideration of return to flying. The underlying cause of the ulceration needs to be identified and corrected wherever possible.
2.9.5 Hepatitis

Acute

Acute hepatitis may be due to a number of causes, predominantly infectious but may also be toxic or immunological. The individual is usually too sick to function adequately and is not physically able to fly. The enterically mediated causes, mainly Hepatitis A and E, and other causes such as CMV and EBV generally result in a full recovery. Initial work up should include routine blood tests, LFTs, FBE, infectious hepatitis serology, and an upper abdominal ultrasound. Return to flying is based on evidence of clinical recovery. Some episodes of hepatitis are followed by a prolonged phase when the patient remains jaundiced but otherwise recovers. No further investigation is recommended until six months after presentation, unless the episode is fulminant. In this case, patients may progress from walking to moribund in 24 to 48 hours, but thankfully this extremely fulminant presentation is rare.

Chronic

The main causes of chronic hepatitis of aeromedical concern are Hepatitis B and Hepatitis C. These may be slowly progressive and may lead to cirrhosis and hepatic decompensation. There is unlikely to be an acute presentation, unless unexpected decompensation occurs secondary to portal hypertension causing haematemesis or ascites with infection.

Transmission of infection is not an issue in civilian aviation. The presence of Hepatitis D in particular should raise the prospect of intravenous drug use.

Treatment for Hepatitis C. Current treatment protocol for progressive Hepatitis C infection is combined Interferon and Ribavirin. Both of these medications have significant aeromedical issues, with interferon occasionally causing neuropsychiatric symptoms, which may occur intermittently and unpredictably throughout treatment. Most people also experience significant malaise. Ribavirin produces a significant anaemia in many patients. Thus, there should be no flying or controlling during the course of treatment. There may be consideration of return to duties once off medication and any anaemia has resolved.

Progressive hepatitis There is no one measure of the progression of chronic hepatitis and cirrhosis. Bilirubin, albumin and prothrombin time/INR are the best independent laboratory measures. These should be considered together with the presence of ascites and encephalopathy. Each case needs to be individually assessed, particularly for the presence of portal hypertension and hepatic encephalopathy, including minimal (stage 1) hepatic encephalopathy (MHE). While there is no overt deterioration in cognitive or affective functioning, there will not be a restriction on flying, but increased surveillance will be necessary.

Abnormal LFTs that have been noted for greater than 12 months indicates the potential for chronic liver disease and cirrhosis.
Liver biopsy. A liver biopsy provides very useful diagnostic and prognostic information but can cause serious complications such as intra-abdominal haemorrhage. The decision to recommend biopsy will usually be delayed for at least six months after presentation depending on the degree to which liver enzymes and function are abnormal. Many patients with abnormal liver enzymes, even over a long period, will not have an absolute indication for liver biopsy. The timing of liver biopsy, if necessary, can be based on clinical progression and the level of concern expressed by the patient regarding diagnosis and prognosis.

2.9.6 Abnormal Liver Function Tests

Liver function tests are frequently found to be abnormal, with small elevations in one or two liver enzyme parameters. Given that the normal range by definition comprises two standard deviations from the mean, some 5% of all truly normal results will be classified as being abnormal—that is, falsely abnormal results. Where there is a real abnormality, the most common causes are Gilbert’s Syndrome (slightly raised unconjugated bilirubin, most common manifestation), non-alcoholic fatty liver disease (NAFLD), and minor alcohol effects.

In the absence of other clinical clues, slightly abnormal LFTs are best repeated after around one month. If they remain elevated, then the following is recommended:

1. Assessment of alcohol intake.
2. Family history of liver disease.
3. Blood Tests: Hepatitis B & C; Iron studies including ferritin; Copper studies; α1 antitrypsin; hepatic autoantibodies.
4. Upper abdominal ultrasound.

Definitive diagnosis of a fatty liver can only be achieved by liver biopsy, but it is usually diagnosed based on clinical picture only. Alcoholic disease and diabetes mellitus should be included in the differential diagnosis. Ultrasound is moderately reliable for fatty liver, with increased echogenicity/altered hepatic texture most likely to be due to fat. However, fibrosis or cirrhosis could also be present and difficult to detect.

There should be regular reviews of aircrew with continuing abnormal LFTs. Where transaminase is <100, repeat testing should be every six to 12 months. If the transaminase is above 100, testing should be every three to six months.
2.9.7 Alcoholic Liver Disease

This section will not discuss alcohol related illness. Rather, there will be a discussion of the effects of alcohol on the GI system.

There are no definitive tests that can demonstrate clearly that alcohol is the cause of liver disease. In the end it comes down to honest reporting. Blood tests can help; MCV, γGT and AST>ALT are suggestive. Liver biopsy is not definitive as many other causes can produce similar findings. Carbohydrate deficient transferrin is becoming used, but it remains largely a research tool. It can be useful as a confirmation, and to monitor progress within that individual.

Relapsing hepatic decompensation, gastritis, neurological signs, including cerebellar signs are all useful as part of a broader picture in advanced cases of alcoholic liver disease when cognitive and physical incapacity are present. DUI convictions may also be indicative.

Screening tests have not been found to be particularly valuable. The AUDIT is probably the most widely used. The tests are aimed at the severe end of the alcoholic spectrum. In practice, concern should be raised where the drinking exceeds the NH&MRC recommended limits of four standards drinks per day for men and two standard drinks per day for women.

Approximately 1:5 people who drink excessively will have liver abnormalities. It is the most reversible form of liver disease in the early stages. Stopping drinking will usually reverse abnormalities within around six months. The alcoholism is more important than the alcoholic liver disease, and the focus should be put on the alcoholism. Until there is a secondary effect from liver damage, there should be no impact on flying from the liver disease. The impact on flying will be from the alcoholism.

2.9.8 Gallstones And Gall Bladder Diseases

Asymptomatic gallstones (chance finding). It appears that the risk of cholecystitis in the presence of asymptomatic gallstones, where there has never been symptoms, is low, and almost certainly is below 1% per annum, although there is little data to work from. Gallstones ranging from a single large stone to multiple small stones may be detected by ultrasound. There is a slightly increased risk of biliary colic, pancreatitis and other hepatobiliary symptoms with small gallstones but the outcome of expectant versus prophylactic cholecystectomy is no different. There will generally be no change to flying status unless gallstones become symptomatic. In those who are asymptomatic there is no requirement to remove the gall bladder for fitness to fly.

Acute cholecystitis. Generally the pilot will be too sick to fly.
2.9 Gastroenterology

**Following single episode of cholecystitis.** Often after a single episode, patients are treated expectantly and wait to see if another episode occurs. However, the risk of a further episode is around 5% per annum. Therefore, it would be expected that there is no return to flying until the gall bladder is removed. There may be the option of multi-crew certification for Class 1 or 2, or no solo controlling for Class 3 pending definitive resolution.

**Stones in bile duct.** The presence of stones in the bile duct is not compatible with flying or controlling. There is a significant risk of ascending cholangitis or pancreatitis, and the stones must thus be removed prior to returning to any duties.

### 2.9.9 Haemochromatosis

Haemochromatosis is a genetic disease that is often found incidentally, mainly through liver function testing or iron studies. The presence of the relevant genes in the Australian population is around 1:200. Around 50% of these will develop significant iron loading but not all genetically affected individuals develop liver or other organ injury (i.e., phenotypic variation in disease expression). Organ injury depends on the severity of iron loading and co-factors such as significant alcohol consumption or other co-existent causes of liver injury. Should iron loading be prevented (usually by early detection and venesection treatment) then permanent liver injury (fibrosis/cirrhosis) usually does not occur. The best measure of iron stores in this context is serum ferritin.

Screening is possible, but to date has not been recommended in the Australian population. This may be by transferrin saturation, or by HFE genetic testing. There is no requirement to screen for haemochromatosis in the aviation context unless there is a family history of the disease.

Late diagnosis can be a problem, with progression to cirrhosis, pancreatic injury (diabetes mellitus), heart (arrhythmias, heart failure) and pituitary involvement. Males usually present in the 5th decade, females in the 6th decade due to their generally lower rate of iron load. If, at age 40 years the ferritin level is less than 1000 ugm/l and LFTs are normal, the risk of permanent liver damage is negligible. Cardiac assessment should include the presence of conduction defects and cardiomyopathy.

Treatment is via regular phlebotomies/venesection. Pilots and controllers should not exercise the privileges of their certificates for 24 hours after each venesection due to possible cardiovascular instability.
2.9.10 Pancreatitis

Pancreatitis is sometimes diagnosed in the setting of a small increase in serum lipase. However, for the diagnosis to be made there should be a significant increase in lipase together with acute abdominal pain.

The main risk factors are

- **Gall stones.** If gallstones are found, where there are no other risk factors, the gall bladder should be removed.

- **Alcohol.** This usually produces a relapsing picture.

- Hypercalcaemia.

- Hyperlipidaemia.

Where there is no obvious cause, there may be abnormalities in anatomy. Assessment is usually by MRCP first, followed by ERCP.

Risk of recurrent attacks is highly individual. Idiopathic pancreatitis may be expected to have one to two attacks per year.

**Single episode.** Following a single episode, where there are no ongoing symptoms and any predisposing factors have been addressed, the individual will usually be able to return to flying.

**Recurring pancreatitis.** While symptomatic the individual is very unwell, usually requiring narcotic analgesia. Recurrent pancreatitis is generally not compatible with continued flying or controlling.

**Chronic pancreatitis.** Generally the individual is too sick or has too much ongoing abdominal pain to contemplate flying. A CT scan can be performed to look for the presence of a pseudocyst or abscess. It is unlikely that anyone suffering from chronic pancreatitis will be fit for flying or controlling duties.

There is an association with the development of diabetes; a fasting blood sugar should be obtained as part of the workup.
2.9.11 Coeliac Disease

Coeliac disease can produce severe symptoms of bloating, diarrhoea, abdominal pain and anaemia, but mostly symptoms are mild and presentation is now usually in mid-life. Treatment with a gluten-free diet is usually effective, and should not be an aviation safety issue. People non-compliant with dietary modifications will continue to be symptomatic and some patients will exhibit refractory disease; these cases should be considered on their merits.

Coeliac disease should be thought of as a potential marker for other immunologically mediated diseases, such as type 1 diabetes mellitus and thyroid disease.

2.9.12 Irritable Bowel Syndrome

Irritable bowel syndrome is a very common diagnosis in the Australian pilot population. Some 20% of adult females and 10% of adult males have some symptoms consistent with this diagnosis. Most common symptoms are of abdominal pain, bloating, diarrhoea and constipation. It is unusual to get acute, severe symptoms.

There is a high co-morbidity with obsessive and depressive illness and SSRIs are often used.

Most people can be managed without drugs, using diet.

Diarrhoeal symptoms may be treated with loperamide. This drug does not usually have any central nervous system side effects. Diphenoxylate should not be the first drug of choice for aircrew or controllers, due to its potential neuropsychological effects. If it is necessary, this should be discussed with Aviation Medicine Section doctors.

Colicky abdominal pain and more general abdominal discomfort can be treated with anti-cholinergics such as donnatabs or mebeverine. Bloating will tend to persist despite treatment. Caution is required regarding anticholinergic side effects, particularly to vision.

Constipation can be treated with high fibre and simple laxatives, with osmotic laxatives such as magnesium sulphate or lactulose preferred in the longer term.

For refractory symptoms, tricyclic antidepressants are the most effective. Tricyclic antidepressants have significant potential aeromedically adverse effects. Refer to Section 2.6 Psychiatry for further guidance.

Most applicants will be fit to hold a certificate. Surveillance may be required annually in the more severe cases.
2.9.13 Inflammatory Bowel Disease

It is often assumed that Ulcerative Colitis and Crohn’s disease are versions of the same disease or are even interchangeable. However, they do have differing natural histories, with Crohn’s disease tending to be worse, with relapse being the rule.

It should be assumed from the outset that Inflammatory Bowel Disease (IBD) will impinge on certification. However, most sufferers are able to obtain certification with regular surveillance.

High-dose systemic steroids should not be used while flying due to the risk of neuropsychological side effects.

If the disease is unstable the person should be grounded, due to diarrhoea, pain and poor nutrition. Stabilisation is usually over several months during treatment with aminosalicylate drugs (e.g., sulphasalazine, mesalazine, olsalazine) and either systemic or rectal corticosteroid treatment. Immunomodulatory medication (such as azathioprine or 6-mercaptopurine) is used to prevent disease relapse in more severe cases. There is a higher risk of skin cancer on azathioprine. Methotrexate can damage the liver.

Flare-ups tend to occur in a subacute manner, with warning often over several days. Acute incapacitation is unlikely, unless there is a clear pattern of such already established. Fitness to fly during flare-ups should be handled as a transient event with clearance to return to flight duties according to CASR 67.265.

Ulcerative Colitis

Ulcerative Colitis may be severe, but is often a relatively mild disease. This is especially so of treated ulcerative colitis of the rectum and sigmoid. The disease may ‘burn out’ in the 50s. With proctitis alone, risk of cancer is no different to the general population.

Crohn’s Disease

Almost all Crohn’s sufferers receive surgery at some stage. Systemic symptoms are more common with febrile disease and acute abdomen amongst the more common manifestations.

For mild disease, Full Blood Examination, C-reactive Protein, Liver function tests and rectosigmoid examination should be carried out annually. LFT should be more often if taking methotrexate.

When there has been pancolitis, regular annual or biennial colonoscopy will improve early detection of colorectal neoplasia beginning eight to ten years after initial diagnosis of colitis.
2.9.14 Chronic Diarrhoea

There are many potential causes of chronic diarrhoea. Most commonly there is irritable bowel syndrome. However, it is important to rule out an infective cause. Medications may also be a cause, such as weight loss treatments including xenical.

In general, diagnosis should be by exclusion of treatable GI disorders, and then treated as for IBS.

2.9.15 Diverticulitis

Diverticulosis of itself is not an issue for aviation safety. A single episode of diverticulitis is generally not of significant concern. Where there is chronic symptoms or recurrence, it is important to evaluate for risk of further symptoms. Partial colonic resection may be required. Each case will be considered on its merits.

2.9.16 Colonic Polypectomy

Following polypectomy by colonoscopy, there is an approximate risk of 1:300 to 1:500 that a significant colonic bleed from the polypectomy site will occur in the first two weeks. The risk is higher if anti-platelet drugs or anti-coagulants are taken after colonoscopy. During this time, therefore, it is best not to fly, due to the risk to safety and lack of access to care. However, it may be reasonable to consider flying operations other than single pilot operations or no solitary controlling.

2.9.17 Bowel Obstruction

Bowel obstruction will result in severe pain and vomiting. A history of bowel obstruction indicates a high risk of recurrence. A single band or hernia can be repaired and certification is usual after recovery. However, recurrent obstruction is of grave concern for certification. Generally, the more episodes of obstruction, the greater the risk of subsequent episodes. Certification will be on a case-by-case basis, with a surgical opinion as to the cause and likelihood of recurrence.
2.9.18 Stomas

In this section the underlying illness or event leading to creation of an “-ostomy” is not addressed. Stoma bags are generally vented and filtered to avoid any risk of trapping of gas or odours becoming an issue.

Colostomy

Generally, patients with a colostomy manage well. Most are due to surgery for colon cancer, and the oncology issues are more important. See section 2.14 Malignancy of this handbook. A total colectomy for functional problems often results in small bowel functional problems.

Ileostomy

The major issue with ileostomy is dehydration. Electrolyte disorders are fairly common, with hyponatraemia and bicarbonate loss. Fluid that is usually reabsorbed will be lost through the stoma, and an additional litre of fluid may be required.

The great majority of applicants with a stoma will not be restricted on the basis of the stoma.

2.9.19 Haemorrhoids

Haemorrhoids will occur with a relatively high frequency in the pilot population, due to poor low fibre diet, inadequate seating and dehydration. It is rarely a cause of acute incapacitation.

Rectal bleeding should be investigated to exclude other causes, especially carcinoma, even in the presence of haemorrhoids. Only with the exclusion of other causes should the haemorrhoids be regarded as the cause.

An acute clot in an external haemorrhoid often causes marked discomfort, but should not be sufficient to cause incapacitation.

The presence of haemorrhoids should not in general hold up certification.

2.9.20 Anal Fissure

As for haemorrhoids, the presence of bleeding should result in investigation to exclude other more serious causes. The fissure may be distracting but not to the extent of incapacitation.
2.9.21 Abdominal Hernias

Abdominal hernias are of concern due to the risk of acute intestinal obstruction. Where the hernia is amenable to repair and there is a risk of obstruction, it should be treated. If no treatment is planned, a justification based on likelihood of becoming symptomatic should accompany any application. While waiting for repair, the need to restrict the applicant will depend on clinical circumstances. Where there is a bowel loop in a hernia, restriction is likely.

Hiatus hernias only infrequently require repair. A rolling hiatus hernia is at greater risk of obstruction. Generally symptoms can be managed through the use of proton pump inhibitors or H₂ antagonists.

2.9.22 GI Bleeding of Unknown Cause

Where there is an iron deficiency anaemia that has been investigated, and endoscopy and colonoscopy are reported as normal, the source of bleeding is likely to be from the small bowel. Often iron deficiency occurs in those who have had long-term aspirin or NSAID treatment. At present, in the absence of ‘red flags’ (eg, systemic symptoms such as unexplained weight loss, fevers, night sweats, persistent significant change in bowel habit, abdominal pain or symptoms of overt GI bleeding such as malaena) to suggest a serious cause, the patient will not be further investigated, and iron supplements used. If supplements are successful, then a cause will probably never be found.

Where iron supplements are used and anaemia progresses, further investigation is required; this may be enteroscopy using a similar procedure to endoscopy, ‘capsule endoscopy’ and/or CT scan. A thorough work up is mandatory to exclude significant disease.

It should not be necessary to ground pilots except those whose anaemia progresses and haemoglobin drops below 10.

If the Hb recovers, then surveillance should be of regular Hb levels, at least every two months for 6-monthly and subsequent testing depending on progress. Restoration of body iron stores (as documented by a progressively normalising serum ferritin taken during a period when iron supplements have been stopped for at least one week) by treatment with oral iron supplements usually takes three to six months minimum, usually with the Hb having returned to normal at an earlier time.

A presentation of malaena is a very different proposition. A cause will need to be identified as there is a high risk of recurrence and of severe causes. The individual should not fly until the cause has been identified and risk of recurrence quantified.
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2.10  Haematology and Reticulo-endothelial Conditions

2.10.1  Introduction

Applicants with haematological conditions are considered individually depending on the nature of the condition, its cause (if known) and natural history. The overriding concern is that the blood must carry sufficient oxygen to satisfy metabolic requirements during all phases of flight.

2.10.2  Reticulo-endothelial System Standard – CASR Part 067

CASR 67  The Reticulo-endothelial System standards are found in the following paragraphs of CASR Part 67:

<table>
<thead>
<tr>
<th>CASR 67.150</th>
<th>For medical standard 1</th>
<th>CASR 67.150(7)</th>
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<tbody>
<tr>
<td>Table 67.150</td>
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<table>
<thead>
<tr>
<th>CASR 67.155</th>
<th>For medical standard 2</th>
<th>CASR 67.155(7)</th>
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<table>
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<th>CASR 67.160</th>
<th>For medical standard 3</th>
<th>CASR 67.160(7)</th>
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<tbody>
<tr>
<td>Table 67.160</td>
<td></td>
<td>3.16</td>
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2.10.3  Anaemia

Applicants whose haemoglobin is less than 100 g/l should be investigated as clinically indicated. Final assessment depends on the results of haematological investigations and response to treatment. Full reports are required.

2.10.4  Polycythaemia

Applicants with higher than normal haemoglobin must be appropriately investigated. In secondary polycythaemia due to lung disease, the lung disease is more important. Applicants with polycythaemia vera, untreated or uncontrolled, will be assessed as failing to meet the standard, but will be reconsidered depending on their response to treatment, and on specialists’ reports.
2.10.5 Acute Leukaemia

Acute leukaemia of any type is disqualifying. Applicants assessed as in remission may be permitted to exercise the privileges of the licence held, depending on specialists’ reports. Full details are required.

2.10.6 Chronic Leukaemia

Chronic leukaemias are assessed individually. A specialist’s report is required in every case, including a statement on prognosis for the next year (re-certification is year by year, if at all). Some chronic leukaemias, e.g. CGL, CLL and other myeloproliferative diseases, are usually associated with an enlarged spleen. There is a consequent risk of splenic infarction and rupture (spontaneous or traumatic) in these applicants.

2.10.7 Lymphomas

Applicants with lymphoma are assessed individually. A lymphoma in remission, especially Hodgkin's Disease, is usually consistent with a pass assessment for applicants concerned. Annual specialist reports are required in all cases.

2.10.8 Haemoglobinopathy

Applicants with abnormal haemoglobins (HbS) are assessed individually. Full reports to Aviation Medicine Section are required.

2.10.9 Haemophilia

Applicants may be certified at the Class 2 level if the condition is stable. Full reports from the treating physician are required.
2.10.10 Oncology

Assessment of applicants with any diagnosis of malignancy is based upon the following considerations:

- Nature of tumour
- Stage of development/invasion
- Response to therapy
- Likelihood of recurrence in a form likely to be incapacitating, e.g. cerebral metastasis.

In general, applicants who are no longer receiving chemotherapy or radiotherapy, in whom the risk of incapacitation is considered to be low during the period of currency of the Medical Certificate, are given a pass assessment subject to continued medical surveillance.

Also see Section 2.14 Malignancy.

2.10.11 HIV Disease

Applicants who are HIV positive but without clinical disease may be certified at the Class 2 level and receive restricted certification (as or with co-pilot) at the Class 1 level.

Applicants should obtain reports (including CD4 helper cell count) from their treating physicians prior to seeking renewal.

When an applicant develops clinical illness associated with HIV disease, further certification is determined on a case-by-case basis. Full clinical details are required.

2.10.12 Blood Donation

In healthy individuals, the fluid depletion that accompanies donation of one unit of blood is replaced within several hours. Any effects from the loss of haemoglobin should not be significant for normal flying operations.

Active pilots should be discouraged from flying until 24 hours have elapsed following blood donation.
2.11 Applicable Regulations

With regard to the **Skeletal System** the **CASR Part 67** states as follows:

**CASR Part 67, Table 67.150 criteria for medical standard 1 states:**

1.25 Is not suffering from safety-relevant active disease of the bones, joints, muscles or tendons

1.26 Is not suffering from safety-relevant functional sequelae of medically significant conditions of the bones, joints, muscles or tendons

**CASR Part 67, Table 67.155 criteria for medical standard 2 states:**

2.24 Is not suffering from safety-relevant active disease of the bones, joints, muscles or tendons

2.25 Is not suffering from safety-relevant functional sequelae of medically significant conditions of the bones, joints, muscles or tendons

**CASR Part 67, Table 67.160 criteria for medical standard 3 states:**

3.23 Is not suffering from safety-relevant active disease of the bones, joints, muscles or tendons

3.24 Is not suffering from safety-relevant functional sequelae of medically significant conditions of the bones, joints, muscles or tendons

2.11.2 Pain Management

Pain is a complex issue. Severity of reported pain is poorly correlated with the severity of the underlying condition. It is thus very important to identify the underlying condition and prescribe pain relief accordingly. The following discussion should be considered in conjunction with **Chapter 13** of this handbook, dealing with certification issues and medication. Each drug group has an annotation, which places it in the category (A-E) as described **Chapter 13**.

**Non-steroidal Anti-inflammatory Drugs (NSAIDs) (B)**

In general, these medications (NSAIDs) are suitable for aviation duties, but with surveillance of possible adverse effects, particularly of gastric origin. The underlying condition for which they are prescribed needs to be considered in each case.
Cyclo-oxygenase type 2 (COX-2) inhibitors have been found to have an association with coronary disease and strokes in those already predisposed, through an effect on platelet function. It is generally advisable to cease COX-2 inhibitors unless the applicant has a history of peptic ulcer disease. Celebrex continues to be available and Mobic is now usurping the past popularity of Vioxx.

The older non-steroidal anti-inflammatory drugs, such as Ibuprofen, Feldene and voltaren continue to have a place.

Aspirin is effective as an anti-inflammatory agent, but has a significant risk of GI bleeding.

**Paracetamol (A)**

A maximum of four grams a day applies in the case of an adult, due to liver toxicity. It is not an anti-inflammatory agent, functioning in the main, directly on the brain to modify pain response in orthopaedic and rheumatological applications. Where the pain is purely mechanical, rather than inflammatory, Panadol may be the better option.

**Disease Modifying Anti-Arthritic Drugs (DMARDs)**

DMARDs have an important role in reducing symptoms from the condition for which they are prescribed. Where the pilot is being managed closely to identify any adverse effect early, and where there has been an adequate trial period—usually 4 weeks after commencing the medication —prior to return to flying or controlling, continued certification is usual. The extent of the functional effect from the underlying condition will be of significance in determining fitness for continued certification.

**Salazopyrin (C).** There are often side effects such as indigestion and hepatotoxic reactions, which largely occur in the first three months. Therefore, the individual should be closely monitored during this initial period of medication.

**Gold (C).** This is out of favour at present. It is toxic to bone marrow and can cause nephrotic syndrome.

**Methotrexate (B).** Toxic effects are revealed early. Full blood count and liver function testing is suggested every six to eight weeks.

**D-Penicillamine (C).** There is a range of side effects such as scleroderma, nephrotic syndrome, myasthenia gravis and marrow toxicity. If an individual is on this treatment without side effects for more than six months, it is likely that they will remain without side effects.

**Luflunamide (C).** In the early period there may be diarrhoea and skin rash. FBE, ESR and LFTs are needed regularly.
Cyclosporin, cyclophosphamide (C). Provides serious immune suppression, but with a high risk of side effects. Generally these are only used when the underlying disease is severe and would normally preclude certification anyway.

Biologic Agents, such as ana kina and anti-tumour necrosis factor preparations (B). Side effects do not appear to be severe. The high cost at present tends to limit their use to severe disease.

Narcotics (C)

It should be considered barring treatment using all forms of narcotics for individuals involved in aviation-related duties. In exceptional circumstances, consideration may be given to individuals requiring narcotic analgesia where:

- The condition itself poses no safety risk
- Narcotics have been used for an extended period and it is clear that there is no adverse effect on attention or cognition
- Neuropsychological testing demonstrates that there is no demonstrable decrement in performance
- ATC simulator testing and pilot in-flight testing indicates satisfactory performance
- There is no requirement to use the medication within 12 hours of commencing aviation activities
- There is no evidence of addiction to the analgesic.

Tramadol is gaining considerable popularity. While not an opioid, it does have narcotic effects and may be addictive. It has inconsistent effects and side effects, with neuropsychological side effects and causing serotonin syndrome. Panadeine Forte contains 30mg codeine and is a significant opioid dosage.

Those applicants taking narcotics are, in general, ones who self-select; that is, those experiencing significant side effects from the medication, or with significant problems from the underlying condition. They should not plan to fly. They may feel suitable for duty, but there may well be subtle impairments and self-delusion (ie overconfidence) that the pilot or controller may not identify.

Amitriptyline (C)

This is often prescribed in low doses of 25 to 50mg at night to augment sleep. It is a soporific and has a long half-life. Some people are highly sensitive and there are a number of cross-reactions. Many people will be 'slow to take off' after taking amitriptyline the night before.
Corticosteroids (B)

Corticosteroids are a mainstay of treatment in many rheumatological conditions. They can be administered dermally, orally, by eye drops, intra-articularly, injection into the affected soft tissue and intravenously. Local application, even by intra-articular injection, is generally safe. Systemic symptoms are rare. However, occasional sleeplessness and hypomania is observed. There should be no flying or controlling within 24 hours following a corticosteroid injection.

Oral corticosteroids have a large and diverse range of adverse effects. These include mood change, thinning skin, diabetes mellitus, immune suppression and osteoporosis. These are almost invariably time and dose related. A general cut-off for onset of side effects is greater than 10mg per day for more than six months. If more than 10mg per day is being prescribed, bone density assessment should be obtained every two years.

If taking oral medications such as dexamethasone or betamethasone, there should be a more intensive monitoring program, as there is a high incidence of side effects. It is important to understand why the individual has been placed on these medications rather than prednisone or prednisolone.

2.11.3 Functional Assessment

Range of movement

Neck range of movement (ROM) is the most important assessment for a DAME. Unless the restriction is severe, ‘trick’ movements are usually available to compensate for limited neck movement. Provided the pilot can evacuate himself and his passengers safely and rapidly, there is generally no impediment strictly due to ROM limitation.

In reporting to CASA, the ROM should be given in degrees in the three planes of movement, flexion/extension, lateral flexion and rotation.

Operational Assessment

A specific flight test to evaluate the functional impact of a restriction of movement due to an orthopaedic or rheumatological condition may be required. Each assessment will depend on the pilot, the aircraft type and the normal aviation activity undertaken.

A DAME may recommend directly to the certificate holder/applicant that such an assessment take place, or a recommendation can be forwarded to CASA for aviation medicine section to consider such an assessment. Where the DAME conducts the assessment from a referral, permission should be sought from the pilot for details of the impairment to be included in the referral letter. The letter to the pilot undertaking the assessment should be written in plain English, requesting advice of the functional effects on the certificate holder’s ability to carry out aviation duties. These may include cross control in strong crosswinds, or single engine flight in a twin-engine aircraft, the full and free movement of all flight controls, and ability to see unimpeded in all significant areas.
2.11 Orthopaedics and Rheumatology

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It is often beneficial to talk to the assessing pilot prior to the assessment to clarify the requirements. A Chief Flying Instructor of a registered flying school can perform the assessment, provided that the individual is prepared to conduct such an assessment. Tests directed to be undertaken by CASA aviation medicine section will usually be performed by an approved testing officer (ATO).

Should the pilot refuse permission for release of relevant medical information, there may be a limited capacity to properly assess the individual, and further testing may be required. The pilot should be made aware of the consequences of the refusal and an attempt made to reach agreement on what information can be imparted.

After commencing narcotic or opioid medication, the ATC or pilot should have a test equivalent to their regular test/training regime. For instance, a private pilot will need to bring forward a biannual flight test, and provide a report of that test as part of the assessment for certification.

2.11.4 Specific Conditions

Arthritis

Rheumatoid arthritis (RA)

RA often has systemic effects. It tends to be erosive, with the destruction of tissue. Joint deformity in the hand and grip weakness is likely to be the most significant issue for aviation. A normochromic normocytic anaemia of chronic disease is common and needs to be monitored. Sufferers can have a fairly normal life, particularly if the activity of the disease is controlled early. As a generalisation, people with Rheumatoid arthritis tend to function at a higher level than the extent and apparent severity of the disease would indicate. Fitness for aviation duties will be assessed on a case-by-case basis.

There may be ophthalmic effects, such as from the use of Plaquenil or steroids. If there are no signs or symptoms of ophthalmic involvement, there is no requirement for routine ophthalmic assessment beyond those stipulated based on age and Class of certificate.

RA should best be monitored for effective management by a rheumatologist rather than GP. An annual report from the specialist will usually be required as part of ongoing certification. Serial plain X-rays, FBE and ESR can follow disease progression and activity. LFTs are usually required to check for side effects of medication.
Osteoarthritis (OA)

There may be primary osteoarthritis, without previous trauma to the joint, or secondary osteoarthritis where there is a predisposing injury. There is usually no inflammation, but Heberden's and Bouchards nodes in the hand do have an inflammatory component. The effects can be divided into functional limitations as a result of reduced range of movement and pain. Simple analgesics and physiotherapy are the mainstay of treatment. Unless there is a significant functional impact, sufferers from osteoarthritis will generally have unrestricted certification. Serial plain X-rays and testing for side effects of medication will be required, again on a case-by-case basis.

Seronegative polyarthritis

This may be rheumatoid arthritis where there is no rheumatoid factor detectable, or those associated with HLA B27. 8% of the Caucasian population are positive for HLA B27, and some 1% to 8% of these develop a seronegative polyarthritis. The most prominent type is Ankylosing Spondylitis (AS), but there is also Reiters syndrome, post-salmonella and post-yersinia infection and psoriatic arthritis.

Ankylosing spondylitis presents as a progressive stiffening of the lower back, with pronounced symptoms after extended inactivity, such as sleep. Physiotherapy modalities, exercise and NSAIDs are the most widely used treatment. It affects males to females in the ratio of 8:1. Sitting for a long time, such as in ultra-long haul sectors, may induce stiffness, but it is generally possible to regularly stand and perform stretches.

Gout

Gout tends to be poorly treated overall. It can be of sudden onset and disabling. There is increased risk from sitting, when dehydrated and post-surgical. Thus, the aviation environment does have significant risk for a gout attack.

Most attacks are in people who are poorly managed and who are not compliant with medication and diet.

More than three attacks a year, particularly where the serum urate is greater than 0.45, and tophaceous gout, where there is the presence of destructive articular disease demonstrating long-standing poor control, carries unacceptable risk of a further attack. Given that the onset can be sudden, within the length of a flight, and can be incapacitating, careful consideration will be given to making the pilot or controller unfit until adequate control is demonstrated. Control would be shown through uric acid levels, compliance with medication such as allopurinol, and avoidance of alcohol and other dietary modifications.
Psoriatic arthritis

This usually presents as mono or oligo arthritis, and affects around 8% of patients with psoriasis. It can be progressive and present similarly to rheumatoid arthritis. It should be considered on a case-by-case basis.

Lupus and Connective Tissue Disorders

There appears to be a reduction in numbers and severity of these conditions in the last 50 years. Systemic Lupus Erythematosus (SLE) is diagnosed mainly through a positive anti-nuclear factor and elevated anti DNA, but requires at least four criteria. DMARDs hydroxychloroquine and steroids are the mainstay of treatment. Multiple organs may be involved, including reticulo-endothelial with anaemia, and kidneys with proteinuria. When stable, SLE should be reviewed by a rheumatologist three-monthly, with certification usually being limited to 12 months. Annual reports will need to address any systemic involvement.

Polymyalgia Rheumatica

This generally presents as an acute illness, with equal sex ratio, and rarely under age 60. There is central joint involvement and night stiffness. It is usually well controlled with corticosteroids, of around 15mg of prednisolone per day. Once on treatment, there is a return to normal function within one month, and a gradual reduction in medication with cessation of medication over a period of around two years.

The condition can be relapsing, with the most serious effects being cranial arteritis, which may result in severe headaches and blindness. Visual loss can be sudden. This is rare once on steroids, and if ESR/CRP results are normal, risk is acceptably small.

All certificate holders should be monitored through three-monthly ophthalmology and rheumatology reviews, and three-monthly ESR tests. Certification is usual, provided the condition is controlled, with six- or 12-monthly validity. The relevant reports will be required for re-certification.

Osteoporosis

This condition is associated with a number of risk factors. These are:

- Chronic ill health
- Cigarette smoking
- Family history
- Systemic steroid use
- Post menopausal women
- Women with non-functioning ovaries.
2. Medical Aspects
2.11 Orthopaedics and Rheumatology

It is less common in males, but still substantial, especially where testosterone levels drop.

In those with established osteoporosis, bone density estimation should be obtained three-yearly. In the presence of a fracture, bisphosphonates such as fosamax and actonel can assist. Weight-bearing exercise is important for prevention and treatment.

There is little immediate relevance in civilian flying if a fracture does not exist or has not occurred. Any fracture should be treated on its own merits.

**Chronic Fatigue Syndrome (CFS) and Fibromyalgia**

This is a diagnosis of exclusion as there is no specific diagnostic test. No pathology has ever been demonstrated to be the cause. It is widely assumed that a psychological disturbance underlies the presentation in most if not all sufferers. Symptoms are diverse, including sleep disturbance, trigger points, and depression. While fatigue is prominent, there is no change in oxygen consumption with exercise; the only detectible change is in terms of perceived effort. Treatment is prolonged and expectant, with anti-depressants widely prescribed. Rest should not be prescribed.

Most CFS patients are not motivated to continue flying while symptomatic. A psychiatric diagnosis should be excluded. While symptomatic, chronic fatigue syndrome is generally incompatible with aviation duties.

**Scleroderma**

In its severest form—progressive systemic sclerosis—this condition can have implications on flying. It is generally found in a population in their third and fourth decades and is more common in females. It can progress rapidly, and involve the hand, resulting in contractures, with marked functional limitation. It can be made worse in cold environments such as often encountered in cockpits with poor environmental control. The CREST syndrome (calcinosis, Raynaud's, oesophageal involvement, sclerodactyly and telangiectasia) often involves pulmonary function, with 15% having pulmonary hypertension. It is important to maintain close supervision through rheumatology follow-up at least annually. Refined pulmonary function testing, CT of lungs and echocardiography will be needed where there is any suspicion of pulmonary involvement.

**Vasculitis**

Polyarteritis nodosum is the most common form. Vasculature anywhere in the body can be involved, and commonly includes the kidneys. Prognosis is always guarded, and certification will be based on history of extent and severity of disease and effectiveness of medication.
Spinal Injury

Whiplash

This condition is something of an enigma, as it tends to be described in only very limited contexts, particularly rear-end motor vehicle accidents. Pathology cannot be demonstrated experimentally. A lateral X-ray should be obtained acutely to exclude instability. A bone scan may be valuable at three weeks to identify bone or connective tissue damage.

Most cases settle very quickly. The principle method of rehabilitation is one of goal setting with steady improvement over several weeks.

Certification should be based on mobility and pain impact. Most cases can be managed by the DAME determining when the certificate holder is fit to return to aviation duties.

Stable fracture of the spine

There should be an expectation of a return to activities within 12 weeks, with an absolute maximum of 26 weeks. The ability to withstand prolonged sitting will be the main decider.

Non-stable fracture of the spine

Where there is operative treatment with insertion of a plate, recovery will be in 12 to 26 weeks. With two fracture levels, there is a longer recovery time, but practically all return to full activity.

Posterior ligament rupture

This is potentially unstable, where two of the three columns in the spine are damaged. Return is based on the treating orthopod advice, but usually should be three months before returning to flying activities.

Spinal fracture with cord lesion

Nearly all such patients will have fixation with pedicle screws. Recovery is usually based on force of injury. It will be necessary to wait for the assessed maximal recovery, and see how the individual is able to function. Urinary tract obstruction is often the main problem. Modifications to the cockpit, such as a Blackwood Pole for pedal manipulation can potentially still permit some flying.

Paraplegia

Once stable and functioning satisfactorily utilising a range of mechanical aids, should the individual wish to undertake aviation activities, functional testing will be required. The main issues will be mobility around the cabin, particularly full and free manipulation of flight controls and emergency egress.
Spinal Stenosis

The diameter of the cord is 11 mm minimum. Where the diameter is less than this, symptoms may occur. Pathology is often found in the lumbar region. There may, however, be smaller sizes found in scans, which have no symptoms. Where the neck is involved, there will usually be a myelopathy. The condition is usually slowly progressive, with nerve root pressure and neurologic claudication. Sitting does not affect the condition significantly, and the result is that pilots are affected very little.

Syringomyelia

This condition is more common in males, and is mostly an incidental finding. Symptoms, when present, tend to be vague, with difficulty in fine motor control in the hands. There is an asymmetric abdominal reflex. An MRI will show Arnold-Chiari malformation or a syrinx. Where there are symptoms, there is usually drainage of the syrinx, and reassessment. Most will be able to continue flying unrestricted.

Scheuermann's Disease

This abnormality of bony development is predominantly found in the lower thoracic vertebrae in males. Longitudinal studies have indicated that it has minimal impact in the long-term, and should not affect flying. Occasionally there is significant scoliosis, which requires a brace for about six months.

Spondylosis

This is an injury to the pars interarticularis. It is not congenital, but is found in 5% of boys by the age of five years. This varies by family history and racial background, and is more common in males. It can occur as a result of overuse in gymnasts and fast bowlers in particular. Rest and attention to technique is the core of treatment.

Spondylolisthesis involves a bilateral lesion with slippage of one vertebral body on the one below. When the slip is at risk of compromising the cord, or there is disability, surgery may be required. There may be some pain or discomfort but generally this does not preclude work.

There is little to suggest that there are any issues for aviation.

Scoliosis

When scoliosis is less than 30° it is of little consequence. Once at 50-60° at the end of its growth, it is often progressive and requires surgical intervention. There is little impact on function or on flying.
Backache

Backache, usually lumbar, is very common. Early normalisation of activities is the cornerstone of treatment. Avoidance of twisting is helpful. The few that are not cured within six to 12 weeks should be assessed in a rehabilitation program to seek an underlying problem.

In rotary wing aircraft, the normal posture of forward bending and lateral flexion tends to induce backache. No degeneration is reported from repeated minor stressors. It is usual not to complain of such pain until after retirement from aviation.

Sciatica

This is leg pain as a result of pressure on nerve roots. Back pain may also be present, but the leg pain is usually much more prominent. Treatment is expectant, with 50% improvement in 12 weeks, 80% in two years and 95% in five years, while surgery (laminectomy) has a 95% success rate. Recurrence is around 1-2% per annum.

It is possible to be fully active with sciatica without the risk of further damage. Thus, return to flying should be based on symptoms and need for medication.

Loss of Limb

Amputation should be considered on the basis of function. Occasionally, phantom pain or a neuroma in the stump can cause discomfort, but this is rare and can be adequately managed. Should the loss of limb be due to a tumour, the risk of recurrence must be taken into consideration.

Above-knee amputation as opposed to below-knee amputation will have a major impact on functionality. The pilot must be able to demonstrate the ability to fully operate the rudders, or modify the aircraft accordingly. A double above-knee amputee is unlikely to be able to fly an unmodified aircraft due to the inability to generate sufficient force to operate the rudders.

Upper limb prostheses that are most functional are not necessarily the most 'natural' in appearance, often being hooks. The loss of digits makes fine manipulation difficult.

Shoulder Injury

Rotator cuff injury. Most commonly, this is due to supraspinatus tear, and recovery is good. Physiotherapy, with up to three steroid injections can be helpful. Arthroscopic inspection can be useful to identify the pathology more accurately. Ultrasound is not helpful unless the sonographer is very experienced. Time to recover can be from 6 weeks to two years. Once able to move the affected arm through an arc in the functional area, the individual can be returned to flying. Surgical repair is sometimes necessary in the young patient.
Shoulder instability. Three episodes of subluxation or dislocation in a single direction should lead to surgical repair. Where there is multidirectional instability with ligamentous laxity, surgical repair is unhelpful, and effort should be directed to conservative treatment of maximal rehabilitation effort. Strength and balance of muscles is needed to overcome the ligamentous injury.

Frozen shoulder. Early treatment of frozen shoulder with local and oral corticosteroids has been reported as beneficial. In chronic, established cases the orthopaedic aim is to break down adhesions limiting the range of movement and causing pain. Early intervention with manipulation under anaesthesia and steroid injections usually results in recovery. Once again, ability to move in the functional arc for flying is needed before return to flying should be considered.

Lateral Epicondylitis

This condition may be encountered in a number of circumstances, usually involving repetitive activities. The core of the treatment is physical therapy with graduated exercises to increase strength and endurance, remediation of the causative activity, and steroid injections into the affected tendon complex are beneficial. Resumption of activity too soon often results in recurrence. Each case should be considered in its merits, based on forearm strength and exacerbating actions.

Carpal Tunnel Syndrome

Typical CTS symptoms involving the median nerve distribution at the wrist, will often respond to conservative treatment modifying activities combined with steroid injection. Surgery is usually curative. With arthroscopic surgery in experienced hands, the individual can return to work within four weeks, while open surgery recovery requires somewhat longer. Return to flying will be based on an assessment of strength and endurance of the wrist.

Upper Limb Fractures

The presence of a plaster is a difficult situation to assess. It is best to not attempt to fly while there is an upper limb plaster in place. A better option from the aviation perspective is usually a pin, possibly with a small splint, which will permit continued activity.

Each case needs to be based on functional capability, which should be assessed by the DAME. If there is a desire to fly while there is a plaster in place, or there is doubt about functional capacity, then a functional test, carried out by a CFI or ATO would be appropriate.
**Lower Limb Fractures**

Lower limb fractures often take 6 months to heal adequately for normal function. However, many fractures are pinned, or can have an inflatable plaster that is only inflated when putting stress through the bone. Thus, most lower limb fractures will be compatible with continued flying. The DAME should assess likely functional limitations of aviation relevance.

**Knee Derangement**

Following an anterior cruciate ligament rupture, there will be a period where the pilot is unfit for flying. Without surgery, this is likely to be around six weeks. With surgery, the expectation would be around three months. Medial collateral ligament tear will have little impact on flying.

**Arthrodesis**

Following an arthrodesis, activity is generally near normal. For flying, a hip arthrodesis will be nearly impossible due to the limitation of mobility. Knee arthrodesis is difficult and will require in flight assessment, while ankle arthrodesis should not produce significant difficulties.
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2.12.1 Ear, Nose and Throat Standard – CASR Part 67

CASR 67.150 For medical standard 1

CASR 67.155 For medical standard 2

CASR 67.160 For medical standard 3

2.12.2 Hearing Requirements Standard – CASR Part 67

CASR 67.150 For medical standard 1

CASR 67.155 For medical standard 2

CASR 67.160 For medical standard 3

2.12.3 Examination of the Ear

There should be no signs of active disease of the middle ear cavity. Applicants should be able to ventilate the middle ear.

Perforations of the tympanic membrane are acceptable, however the cause of the condition should be sought and investigations initiated, if appropriate.
2.12.4 Hearing

An applicant for a Class 2 Certificate must be able to hear an average conversational voice at two metres with the back to the examiner. Accordingly, applicants who are deaf in one ear may pass.

More rigid standards apply to professional licence holders. Audiograms are required for initial Class 1 and 3 and at defined intervals thereafter.

If any doubt arises as to the acceptability of an applicant's hearing, an audiogram should be obtained and, if appropriate, specialist consultation recommended. The audiogram printout should be enclosed with the medical report for initial issue Class 1 and 3 examinations.

Audiograms are acceptable from facilities other than Australian Hearing Services (AHS) facilities. Applicants who are found for the first time to be within 10dB of the limits stated in the schedule should be retested by AHS. Where the deficit is long-standing and has been previously recorded, a non-AHS audiogram will be acceptable provided it demonstrates no significant deterioration.

Where a supplementary speech test is required, this can only be performed by AHS as the calibrated tapes and other equipment required are not available elsewhere. If the applicant fails the speech-based hearing test, in some cases an in-flight test may be offered if he/she has a high level of aeronautical experience. Such an operational check will involve evaluation of relevant aspects of the applicant’s hearing by a CASA Flying Operations Inspector or an Authorised Testing Officer with test material transmitted from a control tower. Ideally the test should be conducted in the class of aircraft, which is the same as that which the applicant normally operates or intends to operate.

Applicants for Class 2 Certificates may wear hearing aids during testing. Any applicant who meets the hearing standard in this way is required to wear the aid during all communications on the ground that relate to the conduct of a flight. Adequate amplification during flight may be achieved by the use of headphones. Headphones with ear cups have the added advantage of blocking out aircraft noise. All pilots should be encouraged to fly with headphones, in the interests of improving hearing and for hearing conservation.

2.12.5 Vestibular Function

Any history of vertigo or dizziness should be fully investigated and the presence of nystagmus noted. If there is concern about vestibular function, referral for caloric testing and electronystagmography should be considered.
2.12.6 Speech

Any significant speech impediment or stuttering should be reported, and full details are required. As a minimum, reports from an ENT specialist and from a speech pathologist should be obtained and forwarded to Aviation Medicine Section, together with the DAME's own assessment of the condition and its likely effects on the safety of air navigation.

2.12.7 Sinuses

Applicants with acute sinusitis are "temporarily unfit" for aviation duties. Chronic sinusitis is unacceptable until appropriately referred, treated and improved.
2. Medical Aspects
2.12 Ear, Nose and Throat and Hearing

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2.13 Medication – Drugs and Flying/Controlling

2.13.1 Introduction

The increasing use of drugs, both prescribed and self-administered, within the Australian community, presents a significant challenge to DAMEs when determining an applicant’s fitness for aviation related duties. All drugs, even those purchased “over the counter (OTC)”, may have adverse effects that may render aircrew members or air traffic controllers unsafe to fly or to perform their normal duties.

**General Principles**

As a general principle, DAMEs should assume all medications are hazardous for aviation operations until demonstrated otherwise.

When assessing whether a pilot or Air Traffic Controller (ATC) taking medication is fit for aviation-related duties, two principal issues should be considered:

- The potential for the underlying medical condition to affect fitness for flying or controlling duty
- The potential for the treatment (including drug therapy) to reduce fitness for flying or controlling duty.

The following characteristics of specific compounds will influence the limitations on their safe use in the aviation environment:

- Unwanted, dose-related drug effects (e.g. blurred vision or drowsiness)
- Hypersensitivity/allergic reactions
- Idiosyncratic effects
- Drug side effects that may occur in some of the population (e.g., nausea, liver damage or bone marrow suppression)
- Drug combination effects – potentiation
- Drug interactions; particularly with alcohol, to increase risk of side effects or reduce activity of the drug/s.
Virtually all drugs unacceptable for aviation duties, regardless of the nature of the disorder being treated, have one or more of the following effects:

- CNS depression
- CNS stimulation
- Autonomic nervous system disturbance
- Disturbance of equilibrium.

### Determination of Fitness for Aviation Duty when Taking Medications

It is not practicable in this chapter to indicate whether a specific drug or even class of drug is always compatible with safe flying or controlling. Rather, this chapter provides a general overview of many commonly used medications and their use in the flying environment. Whenever a DAME is in doubt about a pilot or controller who is taking a drug or medication, advice should be obtained from the CASA Aviation Medicine Section.

With regard to their effect on fitness for aviation duties, medications may be divided into five groups:

**A.** Those medications considered safe when flying or controlling.

**B.** Those medications generally considered compatible with aviation duties without restrictions once the possibility of idiosyncratic reaction has been eliminated (generally after a period of ground trial). Applicants using these substances may be cleared to exercise the privileges of their licences by a DAME.

**C.** Those medications which may be compatible with aviation duties, but which require a specific assessment by CASA. Only CASA can clear pilots and ATCs to use these drugs while performing aviation-related duties.

**D.** Drugs that are not compatible with flying or ATC duties.

**E.** Those medications that do not fit any of the above groups, or where there is uncertainty. In such cases, the DAME should either:

- Contact CASA’s Aviation Medicine Section prior to any decision to certificate or not certificate a licence holder or applicant; or
- Not endorse the certificate and refer the matter to AMS for determination.
A. Medications compatible with flying or controlling

The following medications may be taken without consultation:

- Simple analgesics such as single doses of aspirin, paracetamol, and ibuprofen to provide analgesia may be used for minor self-limiting conditions. Paracetamol is preferable as there is less risk of gastric irritation. Medications containing Codeine should not be used for this purpose.

- Simple antacids may be used for mild isolated episodes of gastric disturbance. Mixtures containing anticholinergics or antispasmodics should not be used by an applicant engaged in aviation duties. Simple antacids do not include H₂ receptor antagonists.

- Antidiarrhoeals such as kaomagma, kapectate and bismuth subcitrate are acceptable for mild afebrile diarrhoea.

- Nasal sprays such as oxymetazoline or phenylephrine, to be used as a ‘get-me-down’ should unexpected ear or sinus block occur during flight.

- Non-prescription suppositories and topical anorectal ointments/creams used to treat simple haemorrhoids.

- Topical medications including antiseptics, topical acyclovir, antifungals, weak steroid creams or benzoyl peroxide used for minor wounds and skin conditions, vaginal creams/pessaries and suppositories.

Note: Schedule 4 (prescription only) items such as topical antibiotics and tretinoin skin applications are not included.

- Oral Contraceptive Pill (combined OCP or mini-pill), injectable progesterone contraceptives and implantable progesterone contraceptives.

- Nicotine gum, patches or sprays used for smoking cessation.

- Steroid nasal sprays used to treat hay fever.

- Moistening or simple astringent eye drops

B. Medications requiring ground trial before DAME approval of use when flying or controlling

Pilots and ATCs taking the following medications require a ground trial (and/or AMS consultation) prior to DAME approval to fly or control:
Designated Aviation Medical Examiner’s Handbook
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2.13 Medication – Drugs and Flying/Controlling

Approved by Assistant Director, Aviation Safety Standards  Version 3.0: December 2003

- **Anaesthetics.** Medical certificate holders require clearance from a medical practitioner following the administration of any anaesthetic agent:
  - Minimum of 12 hours following local or regional (including dental) anaesthetics. (The condition for which the anaesthetic has been administered must also be considered prior to returning an individual to flying or controlling duties).
  - Minimum of 48 hours following general, spinal or epidural anaesthetic. This proscription includes drug-induced sedation. (The condition for which the anaesthetic etc has been administered must also be considered prior to returning an individual to flying or controlling duties).

- **Hypnotics.** Medical certificate holders should not fly or control for at least 12 hours after ingesting the sleep-inducing agent Temazepam. Medical certificate holders should not fly or control for at least 8 hours after using the sleep-inducing agent Zolpidem. Pilots and ATCs who use Temazepam or Zolpidem should not combine these drugs with alcohol. The use of the sleep-inducing agent Triazolam is not compatible with flying or controlling duties due to its potential CNS side effects. The use of Melatonin is not supported by CASA due to variation in its formulation and variability in its effects.

- **Antibiotics (oral and topical).** Medical certificate holders may continue to undertake flying or controlling duties when taking antibiotics provided:
  - the infectious condition being treated will not significantly interfere with aviation-related activities and will not be exacerbated by the specific operating environment, and
  - the prescribing medical practitioner or DAME has determined there are no adverse drug reactions from the antibiotic which has been prescribed. This would normally involve a short (approximately 48 hour) ground trial or previous use of the same antibiotic.

- **Immunisations.** Medical certificate holders should not undertake aviation-related duties for 24 hours after receiving the following vaccinations (primary and boosters):
  - Adult diphtheria and tetanus
  - Poliomyelitis
  - Hepatitis A & B
  - Measles, mumps, rubella
  - Yellow fever
  - Typhoid
  - Tuberculosis (Mantoux Test or Bacille Calmette-Guerin);
  - Influenza
  - Varicella
  - Meningococcal
  - Pneumococcal
  - Cholera.
Class 3 medical certificate holders receiving these vaccinations will usually remain fit for duty, but should consult a GP or DAME in individual cases of doubt.

After receiving the following immunisations (primary and boosters) there should be no aviation-related duties for a minimum of 72 hours:

- Japanese Encephalitis.

**Non-sedating antihistamines**

**C. Medications which may be compatible with aviation duties, but which require specific assessment by CASA**

For many of the following medications, it is important to note that they will be prescribed to treat particular conditions. Refer to the relevant section regarding certification requirements for that condition as well as to the issues discussed here.

CASA approval is required prior to pilots and ATCs who are taking the following classes of medications returning to flying or controlling duties:

- **Sedating Antihistamines:**
  - These should only be used when there is at least 12 hours between use and commencing aviation-related duties.

- **Antihypertensives:**
  - ACE inhibitors
  - Calcium channel blockers
  - Diuretics
  - Beta blockers.

- **Antiarrhythmics:**
  - Quinidine
  - Disopyramide
  - Verapamil
  - Amiodarone
  - Digoxin.

- **Gout medications:**
  - Allopurinol (colchicine is not usually suitable)
  - Probenecid
  - Non-steroidal anti-inflammatory medications.

- **Hypolipidemic drugs:**
  - HMG-COA reductase inhibitors
  - Gemfibrozil (gemfibrozil and statin medications are not to be used together)
  - Cholestyramine (colestipol is not suitable).
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- Ophthalmological preparations:
  It is possible for patients to absorb sufficient beta-blocker through ocular administration to affect cardiovascular response to exertion/exercise.
  - Timolol (glaucoma)
  - Betaxolol (glaucoma).

- Thyroid disease:
  - Thyroxine requires a 14-day trial.

- Antidepressants.
  - Selected non-sedating selective serotonin reuptake inhibitors (SSRIs) require a minimum of 28 days ground trial. The underlying condition should be considered prior to returning the aviator to duty. MAOIs and tricyclic antidepressants are not generally considered compatible with aviation-related duties. (Also see section 2.6 Psychiatry.)

- Other medications:
  - Oral acyclovir or famcyclovir for genital herpes
  - Griseofulvin or terbinafine for systemic antifungal therapy requires a 28-day trial. Monthly liver function testing is required
  - Omeprazole for oesophagitis and peptic ulceration maintenance therapy, following endoscopic confirmation of ulcer healing
  - Ranitidine for peptic ulceration maintenance therapy, following endoscopic confirmation of ulcer healing
  - Clomiphene to enhance oogenesis
  - Sucralfate for non-ulcerative GI symptoms
  - Tetracycline (low dose, for long term treatment of acne)
  - Sulfasalazine for prophylaxis of well controlled ulcerative colitis
  - Sulfamethoxazole/trimethoprim for chronic urogenital tract infections.

When these classes of medications are prescribed, the following actions should be taken:

- Ground trial: The length of the ground trial will be determined on a case-by-case basis in consultation with CASA Aviation Medical staff, and will also depend on control of the underlying disorder and any side effects of the medication.

- Consultation: The DAME should contact CASA Aviation Medicine Section to discuss specific requirements for an applicant using or proposing to use any medication whose side effect profile is unknown or of possible concern.
D. Medications not acceptable for/not compatible with aviation related duties

The following medications are not compatible with aviation related duties and are never to be approved for use by a medical certificate holder without prior specific written approval by CASA.

- Narcotics
- Insulin
- Amphetamine
- Cytotoxics
- Psychotropic medications
- Anticoagulants
- Nitrates
- Complex antidiarrhoeals. Mixtures containing antispasmodics (eg, Lomotil, Imodium) are not usually compatible with aviation-related duties.

E. Other medications such as vitamins, minerals and herbal preparations

Aircrew are to treat herbal medications as they would any other OTC medication. There is a potential for unforeseen consequences when taking such preparations and aircrew and ATCs should consult a DAME for advice before taking such medications and performing aviation-related duties.

Vitamins, minerals and dietary supplements

In Australia, all medicinal therapeutic products must carry an AUST L or AUST R number on the label, unless exempt. Vitamins and minerals are considered listed therapeutic goods meaning quality and safety factors have been assessed by the Therapeutic Goods Administration. In general, pilots and ATCs should not exceed the Recommended Daily Allowances for these products.

Herbal preparations

Herbal preparations are widely available in the community, and are seen by many as a “natural” alternative to conventional medicine. Unfortunately, such agents are not always subject to the same stringent regulations that apply to registered medicinal compounds as noted above. In addition, many of these preparations contain agents that may interact with other drugs and have the potential to cause side effects that are incompatible with flight safety. CASA considers routine use of herbal preparations as being incompatible with flying or controlling duties.
Herbal preparations are derived from plant parts or oils. One should bear in mind that there are no standards for quality, potency, safety or efficacy in their manufacture. Identical products may differ markedly between manufacturers or batches by the same manufacturer. Additionally, many drugs are derived from the same plants used in the herbal preparations. Therefore, many herbal preparations have the same potential side effects as manufactured drugs.

Several herbal preparations present particular threats to aviation safety, alertness, or physical well-being. Below are some of the herbal preparations known to be potentially dangerous.

- **Hallucinogens.** The following may cause hallucinations or disorientation:
  - Californian poppy
  - European mandrake
  - Kava-kava
  - Magic mushrooms
  - Nutmeg (in doses greater than a tablespoon)
  - Periwinkle
  - Thorn apple
  - Yohimbe bark.

- **Sedatives.** The following may cause drowsiness, slow reaction time, or disorientation:
  - Celandine
  - Deadly Nightshade
  - Hemlock
  - Henbane
  - Hops
  - Indian snakeroot
  - Jimson weed
  - Jin bu huan
  - Opium poppy
  - Passion flower
  - Scopolia
  - Skullcap
  - Valerian
  - Wild lettuce
  - Wolfsbane.
2.13 Medication – Drugs and Flying/Controlling

- **Cardiovascular effects.** The following may cause heart palpitations or precipitate myocardial ischaemia/infarction.
  - Broom
  - Ephedra
  - Indian snakeroot
  - Lily of the Valley
  - Pheasant’s eye
  - Purple foxglove
  - Squill
  - Stophanthus
  - White squill
  - Yellow foxglove.

- **Liver poisons.** The following may cause drowsiness, slow reaction time, or disorientation:
  - Borage
  - Chapperal
  - Colts foot
  - Comfrey
  - Germander
  - Life root
  - Thread leafed groudsel.

The DAME often lacks clinical information sufficient to be able to quantify the aeromedical risk from use of herbal preparations. The following questions will be of benefit in evaluating the safety (or otherwise) of these agents:

- Is the use of the preparation due to signs or symptoms that suggest an underlying medical problem separate from the preparation in question?
- Is any component known to have neuropsychotropic effects?
- Is the preparation likely to contain unlabelled or incorrectly labelled ingredients?
- Is the preparation being used in a dose range far outside that of current experience or in an extremely concentrated form?
- Is any component of the preparation known to cause physical harm (even infrequently, unless the quantified incidence of adverse effects is known)?
- Is the preparation an alcohol-based tincture, tonic or elixir?

If all answers are negative, it is difficult to justify prohibition of the particular agent. Any positive answers must be dealt with by education, treating the underlying condition, not endorsing the medical certificate, or referring the matter to Aviation Medicine Section at CASA.
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2.14 Malignancy

2.14.1 Introduction

Malignancy poses a threat to flight safety for a number of reasons including:

- Direct effect(s) of the primary tumour
- Effect(s) of secondary spread
- Effect(s) of treatment modalities
- Psychological effect
- Cachexia
- Endocrine or Biochemical disturbances.

Any pilot or Air Traffic Controller (ATC) diagnosed with a malignancy must refrain from aviation or air traffic control duties until fitness to return to such duties is assessed by CASA.

Automatic return to flying or controlling status should not be assumed. Some pilots and ATCs may be medically certificated following diagnosis and adequate treatment of their malignancy, provided there is an adequate program of ongoing surveillance. Others will require a lengthy period prior to certification due to ongoing symptoms or the risk of recurrence of the primary or metastatic spread. In some circumstances re-certification will not be approved.

Prior to medical certification on a pilot or ATC suffering from cancer, CASA must be sure that an applicant:

- Has recovered from the primary treatment
- Has no sign of residual tumour, of tumour spread or of secondary manifestations of tumour
- Is psychologically stable enough to undertake aviation duties.

Re-certification will depend on the likelihood and type of recurrent disease and the risk that it will adversely affect flight safety.
2.14.2 Principles of Aeromedical Certification of Pilots/ATCs with Malignancy

When considering the aeromedical risk (and therefore the risk to aviation safety) posed by a pilot or ATC suffering from a malignancy, CASA will evaluate:

- Cancer specific issues such as:
  - The type of cancer (tissue and histological diagnosis)
  - Likelihood of recurrence
  - Site of recurrence
  - Presence of any para-neoplastic syndromes
  - Potential for a recurrence to cause overt or subtle in-flight incapacitation.

- Issues related to the treatment of the cancer.

2.14.3 Cancer Specific Issues

Histological variants of a particular tissue cancer may behave biologically differently from other variants. Therefore, when assessing the aeromedical risk of a pilot or ATC with a malignancy, accurate tissue diagnosis of the malignancy is essential.

**Complications of the Malignancy**

Potential complications of malignancy will affect CASA’s assessment of fitness for aviation related duties. Malignancy may lead to pain, wasting, neuropathy, nausea, anorexia, seizures, hypercalcaemia, hyperuricaemia, viscus obstruction, and organ failure. Some cancers have para-neoplastic syndromes associated with their presence. These syndromes result from excessive or ectopic hormones synthesized by a tumour, immune complexes, ectopic receptor production, or release of physiologically active compounds and may manifest in a variety of ways. Most para-neoplastic syndromes have serious implications for aviation safety.

**Likelihood of Recurrence**

Figure 1 depicts the overall survival curve for individuals diagnosed with a theoretical malignancy. For most cancer types, annual recurrence rates can be calculated from survival curves. (As cure following recurrence is rare, overall survival approximates recurrence).
2. Medical Aspects
2.14 Malignancy

**Staging**

Recurrence rates are greatly influenced by the stage of disease when primary treatment occurred. Many cancers are staged using a TNM (Tumour, Node, Metastasis) classification. Figure 2 depicts the variation in survival rates for a theoretical cancer according to the degree of spread evident at diagnosis.

**Tumour Marker**

Tumours may synthesize proteins that produce no clinical symptoms, eg, β-human chorionic gonadotropin, α-fetoprotein, carcinoembryonic antigen, CA 125, and CA 153. These protein products may be used as tumour markers in the serial evaluation of patients for determining disease recurrence or response to therapy. These markers may assist CASA in assessing the suitability of a pilot or ATC to return to aviation duty, as they can often be valuable in tracking response to treatment or recurrence of disease.
Site of recurrence

Each tumour has a characteristic pattern of recurrence. Thus for a theoretical tumour, metastases might occur according to the distribution indicated in Table 1.

Table 1: Distribution of metastasis for a theoretical cancer

<table>
<thead>
<tr>
<th>Site</th>
<th>Incidence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local and lymph nodes</td>
<td>60</td>
</tr>
<tr>
<td>Liver</td>
<td>20</td>
</tr>
<tr>
<td>Lung</td>
<td>10</td>
</tr>
<tr>
<td>Bone</td>
<td>5</td>
</tr>
<tr>
<td>Bone marrow</td>
<td>3</td>
</tr>
<tr>
<td>Brain</td>
<td>2</td>
</tr>
</tbody>
</table>

Risk of particular metastasis causing incapacitation

Several assumptions are made when assessing the risk of a particular metastasis causing incapacitation (either subtle or overt). For a theoretical cancer, recurrence in a regional lymph node carries a relatively small risk of incapacitation. On the other hand, brain metastasis has a near-100% potential for incapacitation (whether sudden due to a fit or bleed, or subtle as a result of pressure effects or headache etc). Thus the incapacitation risk weighting for a theoretical cancer may be as depicted in Table 2.

Table 2: Notional risk of incapacitation from metastasis

<table>
<thead>
<tr>
<th>Site</th>
<th>Incapacitation weighting (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local and lymph nodes</td>
<td>1</td>
</tr>
<tr>
<td>Liver</td>
<td>5</td>
</tr>
<tr>
<td>Lung</td>
<td>5</td>
</tr>
<tr>
<td>Bone</td>
<td>5</td>
</tr>
<tr>
<td>Bone marrow</td>
<td>20</td>
</tr>
<tr>
<td>Brain</td>
<td>100</td>
</tr>
</tbody>
</table>

Total risk of incapacitation

From the parameters defined above, a total risk of incapacitation can be calculated:

- Recurrence rate per year for the particular stage of the malignancy
- Frequency of metastatic disease in a particular organ
- Risk that metastasis in that organ will cause incapacitation.
Thus for an early stage cancer, the result of a calculation of the risk of incapacitation from brain metastasis may be:

\[3\% \times 3\% \times 100\% = 0.09\% \text{ for the first year}\]

For a theoretical late stage cancer from bone marrow metastases, the risk may be:

\[15\% \times 3\% \times 100\% = 0.45\% \text{ for the first year}\]

In order to determine the overall risk, it is necessary to add the risks from all the possible recurrence sites.

### 2.14.4 Treatment Related Issues

In general, cancer is treated in one (or a combination) of the following ways:

- **Surgery** is the commonest treatment for malignant disease, and often is the only treatment. Aeromedical certification after surgery for cancer depends on the extent and success of the operation. Complications of surgery are considered on their merits, taking into account the underlying medical condition and the overall health of the affected individual.

- **Radiotherapy** is usually delivered as an intensive course. The aim may be curative, for example where an isolated group of lymph nodes have been shown to contain malignant cells, or as adjuvant therapy where lymph nodes are assumed to contain metastatic tumour. During the active part of radiotherapy treatment, pilots and ATCs will be assessed as temporarily unfit for duty. Following radiotherapy many patients suffer non-specific systemic effects, such as tiredness, malaise and nausea, which makes it inappropriate for them to partake in aviation activities at least until such effects have resolved. Occasionally there are long-term effects after radiotherapy, such as scarring, which may preclude fitness for aviation duties.

- **Chemotherapy.** During acute chemotherapy treatment (whether curative or adjuvant), pilots and ATCs will be assessed as temporarily unfit, as all chemotherapy drugs are cytotoxic, and frequently have a significant effect on normal tissue, such as rapidly dividing cells in the bone marrow. Once active chemotherapy has ceased and side effects have resolved, aeromedical certification may be possible and will be considered on a case-by-case basis. In some cases low doses of chemotherapy agents may be prescribed as maintenance therapy. Where CASA considers that such medications do not reduce aviation safety, aeromedical certification may be considered, also on a case-by-case basis.
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2.14 Malignancy

- **Hormonal therapy.** Endocrine therapy is used as part of the treatment of some cancers (such as hormone and anti-hormone treatment following breast and prostate cancer). Pilots and ATCs may be returned to flying or controlling if there are no side effects from their hormonal therapy. In all cases, the decision to return to duty while on cancer chemotherapy will be made by CASA Aviation Medicine Section (AMS), on a case-by-case basis, when absence of adverse disease effects is confirmed.

- **Complementary or alternative medicine.** These modalities are commonly used by patients in the treatment of malignancy, particularly where the primary treatment modalities have failed to produce a cure. Where such treatments are used in the presence of continued active disease, the applicant is assessed as unfit. Where the treatment is used to prevent onset of malignancy or recurrence, the treatment will be considered on a case-by-case basis, with regard to the individual’s overall health and the potential effect of the treatment. Herbal medications are discussed in Section 2.13 Medication. All such cases should be referred to CASA AMS for consideration.

### 2.14.5 Specific Malignancies

The commonest forms of malignant disease in the Australian pilot and ATC population are (in order):

- Prostate cancer
- Malignant melanoma
- Bowel (colon) cancer
- Non-Hodgkin’s lymphoma
- Cancer of the testis (multiple types)
- Bladder cancer
- Kidney cancer
- Cancer of the rectum/anus
- Breast cancer
- Hodgkin’s lymphoma.

The following discussion relates to the five most commonly encountered malignancies in the aviation population in Australia, as well as Hodgkin’s Disease. Information on re-certification following diagnosis with such malignancies is to be taken as guidance and indicative only. CASA will address each case individually and make a decision based on its unique issues. In general, DAMEs and certificate applicants may anticipate an outcome along the lines described as a way to plan for possible grounding periods. Applicants should endeavour to provide specialist evidence and opinion to refute the guidance below should there be a request to return to multi-crew or solo flying or controlling prior to the times indicated.
Prostate Cancer

Adenocarcinoma of the prostate is the commonest malignancy in men aged 50 years or more in Australia, and the incidence increases with each decade of life. Hormonal influences undoubtedly play a role in the aetiology of adenocarcinoma. Grading is based on architectural patterns and is commonly reported as the Gleason score: the primary (most prevalent) grade (1-5) plus the secondary (next most prevalent) grade (1-5); thus, it ranges from 2 (very well differentiated) to 10 (very poorly differentiated). Staging is described in Table 3.

Table 3: Staging of prostatic cancer

<table>
<thead>
<tr>
<th>Staging System</th>
<th>Characteristics of Tumour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whitmore</td>
<td>AJCC/TNM</td>
</tr>
<tr>
<td>A</td>
<td>Is clinically inappropriate by palpation or imaging</td>
</tr>
<tr>
<td></td>
<td>T1a</td>
</tr>
<tr>
<td></td>
<td>T1b</td>
</tr>
<tr>
<td></td>
<td>T1c</td>
</tr>
<tr>
<td></td>
<td>T2a</td>
</tr>
<tr>
<td></td>
<td>T2b</td>
</tr>
<tr>
<td>C</td>
<td>T3</td>
</tr>
<tr>
<td></td>
<td>T3a</td>
</tr>
<tr>
<td></td>
<td>T3b</td>
</tr>
<tr>
<td>D</td>
<td>T4</td>
</tr>
</tbody>
</table>

AJCC = American Joint Committee on Cancer
TNM = tumour node metastasis

Symptoms, Signs, and Diagnosis

Prostatic cancer is usually slowly progressive and may cause no symptoms. In late disease, symptoms of bladder outlet obstruction, ureteral obstruction, and hematuria may appear. Metastases to the pelvis, ribs, and vertebral bodies may cause bone pain. Carcinoma is often diagnosed incidentally when malignant changes are found in the tissue removed during surgery for suspected benign prostatic enlargement.

Elevated serum acid phosphatase or Roy test (an enzymatic method) correlates well with the presence of metastatic prostate cancer, particularly in lymph nodes. Although acid phosphatase and Prostatic Specific Antigen (PSA) levels decline after treatment and rise with recurrence, PSA is the more sensitive marker for monitoring cancer progression and response to therapy. However, because serum PSA is moderately elevated in 30 to 50% of patients with benign prostatic hyperplasia (depending on prostate size and degree of obstruction) and in 25 to 92% of those with prostate cancer (depending on tumour volume), its role in early detection and staging is unclear. Significantly elevated PSA levels suggest extracapsular extension of tumour or metastases.
Prognosis and Treatment

Long-term local control—even cure—is possible. However, the potential for cure, even in patients with clinically localized cancer, depends on factors such as grade, stage, and pretreatment PSA level. For patients with low-grade, organ-confined tumours, survival is virtually identical to that for age-matched controls without prostate cancer.

Most patients elect to undergo definitive therapy with radical prostatectomy or radiotherapy. Radical prostatectomy is probably optimal for younger patients with longer life expectancy; they have the lowest risk of urinary incontinence. Radiotherapy may offer comparable results, especially in patients with low pretreatment PSA levels.

An asymptomatic patient with a locally advanced tumour or metastases may benefit from hormonal therapy with or without adjuvant radiotherapy. Hormonal therapy rarely uses exogenous estrogens, which pose an increased risk of cardiovascular and thromboembolic complications.

Medical Certification

Cancer of the prostate has a generally good prognosis, and tends to metastasise locally or to bone. Once primary treatment has been completed, certification will be possible where:

- There is no evidence of metastatic spread
- PSA has returned to normal
- There are no significant consequences of treatment, such as incontinence.

Should there be metastatic spread which has been controlled and PSA has returned to less than 10, certification will also be considered. Certification will be for no more than 12 months. Each CASA medical examination and report must be accompanied by a progress report from a urologist or oncologist, and a recent PSA level. If the applicant shows no signs of recurrence after three years from initial diagnosis, no further follow-up is required. Where there is metastatic spread surveillance will likely be lifelong. Provided no other medical conditions preclude it, there can be a return to regular certification procedures for age and Class.

Malignant Melanoma

Malignant melanoma is the second commonest malignancy in the Australian aircrew and ATC population. The incidence is rising. Sun exposure is a risk, as is family history and the occurrence of lentigo maligna, large congenital melanocytic naevus, and the dysplastic naevus syndrome.

About 40 to 50% of malignant melanomas develop from pigmented moles. Almost all of the rest arise from melanocytes in normal skin. Signs of malignant transformation should be carefully sought: change in size; change in colour, especially spread of red, white, and blue pigmentation to surrounding normal skin; change in surface characteristics, consistency, or shape; and signs of inflammation in surrounding skin, with possible bleeding, ulceration, itching, or pain.
Malignant melanomas vary in size, shape, and colour (usually pigmented) and in their propensity to invade and metastasize. This neoplasm may spread rapidly, causing death within months of its recognition, yet the 5-year cure rate of early, very superficial lesions is nearly 100%. Cure depends on early diagnosis and early treatment. The major types of malignant melanoma are:

- Lentigo maligna melanoma
- Superficial spreading melanoma: accounts for 2/3 of malignant melanomas
- Nodular melanoma: constitutes 10 to 15% of malignant melanomas

**Prognosis and Treatment**

Two classification systems are useful for evaluating melanomas:

- Melanoma thickness as measured from the granular layer of the epidermis to the greatest depth of tumour invasion, as described by Breslow.
- Anatomic level of invasion, as described by Clark. In Clark's classification, level I is confined to epidermis; level II extends into papillary dermis; level III extends further into papillary dermis, with expansion of this layer; level IV extends into reticular dermis; and level V extends into subcutaneous fat.

Increased Breslow thickness and deeper invasion (Clark level) correlate with poorer prognosis. The clinical type of tumour is less important to survival than the thickness of the tumour at the time of diagnosis.

Metastatic spread of melanoma occurs both via lymphatics and blood vessels. Local spread results in formation of nearby satellite papules or nodules that may or may not be pigmented. Direct metastasis to skin or internal organs may occur, and occasionally metastatic nodules or enlarged lymph nodes are discovered before the primary lesion is identified. Melanomas arising from mucous membranes have a very poor prognosis, although they often seem quite limited when discovered.

Treatment is by surgical excision. Although the width of margins is debated, most experts agree that a 1-cm lateral tumour-free margin is adequate for lesions <1 mm thick. Thicker lesions may deserve more radical surgery and sentinel node biopsy.

Thick malignant melanomas and regional or distant metastasis may be treated with chemotherapy. Prognosis is poor.
Table 4: Five-year survival for malignant melanoma

<table>
<thead>
<tr>
<th>Tumour Thickness (mm) *</th>
<th>5-Year Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76</td>
<td>98 - 100</td>
</tr>
<tr>
<td>0.76 - 1.5</td>
<td>90 - 94</td>
</tr>
<tr>
<td>1.51 – 2.25</td>
<td>83 – 84</td>
</tr>
<tr>
<td>2.26 – 3.0</td>
<td>72 – 77</td>
</tr>
<tr>
<td>&gt; 3.0</td>
<td>46</td>
</tr>
</tbody>
</table>

* Tumour thickness is very difficult to assess if histological signs of regression are present.

Aeromedical Certification

Following diagnosis of a malignant melanoma, CASA will not certificate a pilot or ATC for the first 12 months because of the risk of spread to organs such as the brain, lungs or bone. The associated risk of incapacitation is significant. In some circumstances where the prognosis is extremely positive, certification prior to 12 months may be considered.

**Class 1 and 3:** In the absence of recurrence, CASA will usually approve Class 1 and 3 certification as follows:

Table 5: Post-malignant melanoma certification (Class 1 and 3)

<table>
<thead>
<tr>
<th>Tumour thickness</th>
<th>Certification</th>
<th>Period post-diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>0.76 – 1.49 mm</td>
<td>Multicrew</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>24 months</td>
</tr>
<tr>
<td>1.5 – 2.24 mm</td>
<td>Multicrew</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>36 months</td>
</tr>
<tr>
<td>2.25 – 3.0 mm</td>
<td>Multicrew</td>
<td>24 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>48 months</td>
</tr>
<tr>
<td>&gt; 3.0 mm</td>
<td>Multicrew</td>
<td>24 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>60 months</td>
</tr>
</tbody>
</table>
Class 2: In the absence of recurrence, CASA will usually approve Class 2 certification as follows:

<table>
<thead>
<tr>
<th>Tumour thickness</th>
<th>Certification</th>
<th>Period post-diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>0.76 – 1.49 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>1.5 – 2.24 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>2.25 – 3.0 mm</td>
<td>As or with co-pilot</td>
<td>12 months</td>
</tr>
<tr>
<td>&gt; 3.0 mm</td>
<td>Solo</td>
<td>24 months</td>
</tr>
<tr>
<td></td>
<td>As or with co-pilot</td>
<td>24 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>36 months</td>
</tr>
</tbody>
</table>

Certification will be for no more than 12 months, and renewal medical examinations and reports must be accompanied by a progress report from the treating dermatologist or oncologist. These reports will be required for at least 3 years following return to unrestricted duties.

Colorectal (Bowel) Cancer

In Western countries, cancers of the colon and rectum account for more new cases of cancer per year than cancer of any other anatomical site except the lung. Colorectal cancer is the most frequent cause of death from visceral malignancies that affect both sexes. The incidence of this condition begins to rise at age 40 and peaks at age 60 to 75 years. Colorectal cancer spreads by direct extension through the bowel wall, haematogenous metastasis, regional lymph node metastasis, perineural spread, and intraluminal metastasis.

Symptoms, Signs, and Diagnosis

Adenocarcinoma of the colon and rectum grows slowly, and a long interval elapses before it is large enough to produce symptoms. Early diagnosis depends on routine examination. Symptoms depend on the lesion's location, type, extent, and complications. In cancer of the rectum, the commonest presenting symptom is bleeding with defecation. Whenever rectal bleeding occurs, even with obvious haemorrhoids or known diverticular disease, coexisting cancer must be excluded. Simple, inexpensive testing of the stool for occult blood is advised as part of both screening and high-risk surveillance programs.

Elevated serum carcinoembryonic antigen (CEA) is not specifically associated with colorectal cancer, but levels are high in 70% of affected patients. If CEA is high preoperatively, and low after removal of a colon tumour, monitoring CEA may help to detect recurrence.
Treatment and Prognosis

Primary treatment consists of wide surgical resection of the colon cancer and regional lymphatic drainage. The choice of operation for rectal cancer depends on the tumour's distance from the anus and gross extent. Abdominoperineal resection of the rectum requires a permanent sigmoid colostomy. Surgical cure is possible in 70% of patients. The best 5-yr survival rate for cancer limited to the mucosa approaches 90% (stage I, Dukes’ A); with penetration of the muscularis propria, 80% (stage II, Dukes’ B); with positive lymph nodes, 30% (stage III, Dukes’ C).

Medical Certification

Issues dealing with colostomy and ileostomy are found in Section 2.9 Gastroenterology.

Following diagnosis of a bowel cancer, CASA will not usually certificate a pilot or ATC for the first 12 months because of the risk of spread to organs such as the brain, lungs or bone and the associated risk of incapacitation is significant. CASA will require the following information when considering the fitness of a pilot or ATC to return to aviation-related duties following the diagnosis of colorectal cancer: an annual report from the treating gastroenterologist and/or oncologist, including tissue diagnosis, staging and CEA level, for at least 5 years post-diagnosis.

In the absence of recurrence, CASA will usually approve certification as follows:

**Stage I**

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>6 months</td>
</tr>
<tr>
<td>Solo</td>
<td>24 months</td>
</tr>
<tr>
<td>Class 2</td>
<td></td>
</tr>
<tr>
<td>Solo</td>
<td>6 months</td>
</tr>
</tbody>
</table>

**Stage II**

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>12 months</td>
</tr>
<tr>
<td>Solo</td>
<td>36 months</td>
</tr>
<tr>
<td>Class 2</td>
<td></td>
</tr>
<tr>
<td>Solo</td>
<td>12 months</td>
</tr>
</tbody>
</table>
### Stage III

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>24 months</td>
</tr>
<tr>
<td>Solo</td>
<td>648 months</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot</td>
</tr>
<tr>
<td>Solo</td>
</tr>
</tbody>
</table>

### Non-Hodgkin’s Lymphoma

Non-Hodgkin’s Lymphoma is a malignant monoclonal proliferation of lymphoid cells in sites within the immune system, including lymph nodes, bone marrow, spleen, liver, and gastrointestinal tract. Pathological classification of non-Hodgkin’s lymphomas (NHL) is evolving, reflecting new insights into the cells of origin and the biological bases of these heterogeneous diseases. The course of NHL varies from indolent and initially well tolerated to rapidly fatal.

### Incidence and Aetiology

NHL occurs more often than Hodgkin’s disease. Its cause is unknown, although, as with the leukaemias, substantial experimental evidence suggests a viral cause for some lymphomas. Primary CNS involvement and disseminated disease occur. In about 30% of cases, the lymphomas are preceded by generalized lymphadenopathy.

### Pathology

The Working Formulation classifies NHL into prognostic categories having therapeutic implications as follows:

- **Low-grade lymphomas** (38%): Diffuse, small lymphocytic; follicular, small-cleaved cell; follicular mixed, small and large cell.

- **Intermediate-grade lymphomas** (40%): Follicular large cell; diffuse, small-cleaved cell; diffuse mixed, small and large cell; diffuse large cell.

- **High-grade lymphomas** (20%): Immunoblastic lymphoma; lymphoblastic lymphoma; small non-cleaved cell lymphoma (Burkitt’s and non-Burkitt’s types).

- **Miscellaneous lymphomas** (2%): Composite lymphomas; mycosis fungoides; true histiocytic; other, and unclassifiable types.
Symptoms and Signs
Although various clinical manifestations of NHL occur, many patients present with asymptomatic peripheral lymphadenopathy. Enlarged lymph nodes are rubbery and discrete and later become matted. Local disease is apparent in some patients, but most have multiple areas of involvement. Anaemia is initially present in about 33% of patients and eventually develops in most.

Staging
Localised NHL does occur, but the disease is disseminated when first recognized in about 90% of follicular lymphomas and 70% of diffuse lymphomas. The final staging of NHL is similar to that of Hodgkin's disease; however, it is more often based on clinical than pathological findings.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>In one lymph node only</td>
</tr>
<tr>
<td>II</td>
<td>In two or more lymph nodes on the same side of the diaphragm</td>
</tr>
<tr>
<td>III</td>
<td>In the lymph nodes, spleen, or both and on both sides of the diaphragm</td>
</tr>
<tr>
<td></td>
<td>1 Above the renal vessels (eg, spleen; splenic, hilar, coeliac and portal nodes)</td>
</tr>
<tr>
<td></td>
<td>2 In the lower abdomen (periaortic, pelvic, or inguinal nodes)</td>
</tr>
<tr>
<td>IV</td>
<td>Extranodal involvement (eg, bone marrow, lung, liver)</td>
</tr>
</tbody>
</table>

*Subclassification E indicates extranodal involvement adjacent to an involved lymph node (eg, disease of mediastinal nodes and hilar adenopathy with adjacent lung infiltration is classified as stage IIE). Stages can be further classified by A to indicate the absence; or B to indicate the presence of constitutional symptoms (weight loss, fever, or night sweats). B symptoms generally occur with stages III and IV (20 to 30% of patients).

Initially, constitutional symptoms tend to be less common in NHL than in Hodgkin's disease and do not usually alter prognosis. Organ infiltration is more widespread in NHL, and the bone marrow and peripheral blood may be involved.

Prognosis and Treatment
The histopathology, stage of disease, and results of surface marker studies significantly influence the prognosis and response to treatment. Patients with T-cell lymphomas generally have a worse prognosis than those with B-cell types. Other factors that adversely affect prognosis are poor performance status, age >60 years, elevated LDH level, bulky tumour masses (diameter >10 cm), and more than two extranodal sites of disease.

A prognostic index for diffuse mixed, diffuse large cell, and immunoblastic lymphomas has been reported. The International Prognostic Index (IPI) considers five categories: age, performance status, LDH level, number of extranodal sites, and stage. Prognostic groups of low, low intermediate, high intermediate, and high risk may be defined.
Table 8: Outcome According to Risk Group as Defined by the International Prognostic Index

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Risk Factors (n)</th>
<th>Patients * (%)</th>
<th>Complete Response (%)</th>
<th>2-Yr Relapse-Free Survival (%)</th>
<th>5-Yr Relapse-Free Survival (%)</th>
<th>2-Yr Survival (%)</th>
<th>5-Yr Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>0 or 1</td>
<td>35</td>
<td>87</td>
<td>79</td>
<td>70</td>
<td>84</td>
<td>73</td>
</tr>
<tr>
<td>Low - intermediate</td>
<td>2</td>
<td>27</td>
<td>67</td>
<td>66</td>
<td>50</td>
<td>66</td>
<td>51</td>
</tr>
<tr>
<td>High - intermediate</td>
<td>3</td>
<td>22</td>
<td>55</td>
<td>59</td>
<td>49</td>
<td>54</td>
<td>43</td>
</tr>
<tr>
<td>High</td>
<td>4 or 5</td>
<td>16</td>
<td>44</td>
<td>58</td>
<td>40</td>
<td>34</td>
<td>26</td>
</tr>
</tbody>
</table>


A cure may be expected in 30 to 50% of affected patients with intermediate- and high-grade lymphomas undergoing myeloablative therapy. In low-grade lymphomas, it remains uncertain whether cure may be obtained with transplantation, although their survival rate is better than that of patients receiving secondary palliative therapy alone.

**Medical Certification**

Without a complete remission, return to aviation duties will not usually be considered. Once in remission, certification will usually be conducted on a case-by-case basis, using Table 9 (see next page) as a guide. The high rate of late recurrence limits the likelihood of an unrestricted Class 1 or Class 3 certification.

Table 9: Post-remission certification

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Class 1 &amp; 3 solo</th>
<th>Class 1 &amp; 3 multi-crew/no solo controlling</th>
<th>Class 2 solo</th>
<th>Class 2 as or with co-pilot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>4 years</td>
<td>2 years</td>
<td>2 years</td>
<td>1 year</td>
</tr>
<tr>
<td>Low - intermediate</td>
<td>5 years</td>
<td>2 years</td>
<td>3 years</td>
<td>1 year</td>
</tr>
<tr>
<td>High - intermediate</td>
<td>Certification unlikely</td>
<td>2 years</td>
<td>4 years</td>
<td>2 years</td>
</tr>
<tr>
<td>High</td>
<td>Certification unlikely</td>
<td>2 years</td>
<td>5 years</td>
<td>3 years</td>
</tr>
</tbody>
</table>

Timing is after a complete remission has been obtained.

Applications for renewal of a medical certificate must be accompanied by a progress report from the treating haematologist or oncologists detailing treatment, prognosis and current health. Certification will be for a maximum of 12 months until at least 5 years post-re-certification, and at least 3 years following return to unrestricted duties.
**Hodgkin’s Disease**

Hodgkin’s Disease is a localised or disseminated malignant proliferation of tumour cells arising from the lymphoreticular system, primarily involving lymph node tissue and bone marrow.

**Incidence and Aetiology**

Hodgkin’s disease has a bimodal age distribution that peaks at ages 15 to 34 and after age 60. However, the second peak may be an artefact of inaccurate diagnosis, because most cases diagnosed after age 60 are intermediate-grade non-Hodgkin’s lymphomas.

**Pathology**

Diagnosis depends on identification of Reed-Sternberg cells (large binucleated cells) in lymph nodes or at other sites.

**Table 10: Histopathological Subtypes of Hodgkin’s Disease**

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance</th>
<th>Incidence</th>
<th>Progression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lymphocyte predominant</td>
<td>Few Reed-Sternberg cells and many lymphocytes</td>
<td>3%</td>
<td>Relatively slow or indolent</td>
</tr>
<tr>
<td>Nodular sclerosis</td>
<td>Dense fibrous tissue surrounds nodules of Hodgkin’s tissue</td>
<td>67%</td>
<td>Intermediate or moderately progressive; relatively slow or indolent (occasionally)</td>
</tr>
<tr>
<td>Mixed cellularity</td>
<td>A moderate number of Reed-Sternberg cells with a mixed background infiltrate</td>
<td>25%</td>
<td>Intermediate or moderately progressive; aggressive</td>
</tr>
<tr>
<td>Lymphocyte-depleted</td>
<td>Numerous Reed-Sternberg cells and extensive fibrosis</td>
<td>5%</td>
<td>Aggressive</td>
</tr>
</tbody>
</table>

**Symptoms and Signs**

Symptoms and signs primarily relate to the site, amount, and extent of nodal mass involvement. Most patients present with cervical and mediastinal adenopathy and without systemic complaints. Other manifestations develop as the disease spreads through the reticuloendothelial system, generally among contiguous sites. The rate of progression varies according to histopathological subtype.

**Diagnosis**

Hodgkin’s disease can be definitively diagnosed by lymph node biopsy that reveals Reed-Sternberg cells in a characteristic histological setting. Hodgkin’s disease may be difficult to differentiate from lymphadenopathy caused by infectious mononucleosis, toxoplasmosis, cytomegalovirus, NHL, or leukaemia.
Staging

Radiotherapy, chemotherapy, or a combination of both is potentially curative, but the extent or stage of disease must first be determined. The Ann Arbor staging system (see Non-Hodgkin’s Lymphoma) is commonly used.

Treatment

Chemotherapy or radiotherapy regimens cure most patients.

- **Stage I and IIA disease** can be treated with radiotherapy. Such treatment cures about 80% of patients. Cure refers to being disease-free at 5 years post-therapy, after which relapse is very rare.

- For **stage IIIA1 disease**, total nodal irradiation results in an overall survival of 85 to 90%, with disease-free survival of 65 to 75% at 5 years.

- For **stage IIIA2 disease**, combination chemotherapy is generally used with or without radiotherapy of bulky nodal sites. Cure rates of 75 to 80% have been achieved.

- Because radiotherapy alone does not cure **stage IIIB disease**, combination chemotherapy alone or in conjunction with radiotherapy is required. Survival ranges from 70 to 80% (at 5 years).

- For **stage IVA and B disease**, combination chemotherapy has produced a complete remission in 70 to 80% of patients, with >50% remaining disease-free at 10 to 15 years. Patients who fail to achieve complete remission or who relapse within 6 to 12 months have a poor prognosis.

Medical Certification

CASA will not usually consider certification until at least 12 months following successful treatment. “Successful treatment” requires that the disease be in complete remission. Table 11 (below) provides guidance on the likely time before CASA will consider certification, assuming that there are no other significant health issues, no side effects from the treatment and ongoing complete remission or “cure” has been effected. All renewal medical examinations and reports must be accompanied by a progress report from the treating haematologist or oncologist.

**Table 11: Likely certification timings**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Class 1 &amp; 3 solo</th>
<th>Class 1 &amp; 3 multi-crew/no solo controlling</th>
<th>Class 2 solo</th>
<th>Class 2 as or with co-pilot</th>
</tr>
</thead>
<tbody>
<tr>
<td>I and IIA</td>
<td>1 year</td>
<td>6 months</td>
<td>1 year</td>
<td>6 months</td>
</tr>
<tr>
<td>IIIA1</td>
<td>2 years</td>
<td>1 year</td>
<td>2 years</td>
<td>6 months</td>
</tr>
<tr>
<td>IIIA2</td>
<td>3 years</td>
<td>2 years</td>
<td>2 years</td>
<td>1 year</td>
</tr>
<tr>
<td>IIIB and IV</td>
<td>4 years</td>
<td>2 years</td>
<td>3 years</td>
<td>1 year</td>
</tr>
</tbody>
</table>
Testicular Cancer

Testicular tumours account for most solid tumours in males aged less than 30 years. Malignant testicular tumours arise from the primordial germ cell and differentiate to reveal seminoma, teratoma, embryonal carcinoma, endodermal sinus tumour (yolk sac tumour), and choriocarcinoma.

Symptoms, Signs, and Diagnosis

The usual presenting sign is a scrotal mass, sometimes associated with pain. Many patients discover the mass in association with minor trauma. Haemorrhage into the tumour may produce local pain and tenderness. Any firm mass in the testis is cause for immediate clinical suspicion of testicular tumour. Diagnostic studies should include radioimmunoassays for \( \alpha \)-fetoprotein and \( \beta \)-human chorionic gonadotropin. These markers, when elevated, indicate the presence of tumour; they are also valuable in follow-up of patients with proven testicular tumours, especially the non-seminomatous types.

Prognosis and Treatment

Prognosis depends on the histology and extent of the tumour. Survival rates are >95% at 5 years for seminomas and non-seminomas localized to the testis or low-volume metastases in the retroperitoneum. The 5-year survival rate for extensive retroperitoneal metastases or pulmonary or other visceral metastases is poorer and varies with site, volume, and histology of the metastases.

Radical (inguinal) orchidectomy, the cornerstone of treatment, provides important histopathological information for planning further therapy. These parameters can accurately predict the risk of occult lymph node metastases; so low-risk patients with normal x-rays and biomarkers may be candidates for surveillance protocols, especially patients with non-seminomatous germ cell tumours rather than seminomas. Otherwise, standard treatment for seminoma is irradiation after unilateral orchidectomy. For non-seminomatous germ cell tumours, standard treatment is retroperitoneal lymph node dissection.

Medical Certification

Stage 1 (non-metastatic disease):

- **Teratoma with orchidectomy only.** Following recovery from the surgery, unrestricted Class 1, 2 or 3 is usual. For the first 24 months, certification is for 6 months at a time. Each medical is to be accompanied by a report from urologist or oncologist, along with tumour marker levels. Tumour markers will usually rise before any anatomical disease is identifiable. After two years without recurrence, this can increase to 12 monthly certification, until 5 years post-diagnosis.
2.  Medical Aspects

2.14  Malignancy

- **Seminoma with orchidectomy only.** There is a 15% relapse rate. This is usually monitored by serial CT or MRI scans. Unrestricted Class 1 or 3 certification will be delayed for 24 months post-surgery. Restricted Class 1 and 3 and unrestricted Class 2 is possible from recovery after surgery. Certification will be for 6 months for the first two years, then annual until 5 years post-diagnosis.

- **Seminoma with orchidectomy and radiotherapy.** As the cure rate is greater than 99%, unrestricted Class 1, 2 and 3 certification is possible as soon as the individual has recovered from the primary treatment. Certification again will be for 6 months for the first 2 years, then annual, and the medical must be accompanied by a progress report from the treating urologist or oncologist.

**Stage II/III (local metastatic disease):** The prognosis remains good compared with most other malignancies.

*Table 12: Stage II/III (local metastatic disease)*

| Class 1/3 multi-crew/no solo controlling | Following recovery from primary treatment and disease free |
| Class 1/3 solo                          | 12 months following successful treatment                 |
| Class 2 as or with co-pilot             | Following recovery from primary treatment and disease free |
| Class 2 solo                           | 6 months following successful treatment                  |

Renewal medical examinations and reports must be accompanied by a progress report from the treating specialist.

**Stage IV (disseminated disease):** Although 5-year survival is around 60-70%, this outcome is usually achieved only by prolonged chemotherapy. While chemotherapy is required, there will be no certification.

*Table 13: Stage IV (disseminated disease)*

| Class 1/3 multi-crew/no solo controlling | 24 months following successful treatment |
| Class 1/3 solo                          | Certification unlikely                  |
| Class 2 as or with co-pilot             | 12 months after last treatment and continued disease free |
| Class 2 solo                           | 24 months following successful treatment |

Renewal medical examinations and reports must be accompanied by a progress report from the treating specialist.

**Other Malignancies**

This section is not intended to provide detailed advice for all possible malignancies. Other malignancies may be discussed in the relevant organ system section of this *Handbook*. Otherwise, the guiding principles outlined above should be used. Where doubt exists, discussion with, or referral to, CASA Aviation Medicine Section should be undertaken immediately.
2.15 Differences between Australian Medical Certification and ICAO Medical Certification for International Operations

2.15.1 Currency of Medical Certification

ICAO commences periods of currency from the date of the medical examination, not from the date of CASA's assessment nor from the applicant's anniversary date. As an aide-memoire to applicants, CASA's medical certificates record the date on which the applicant's most recent medical examination was performed, to assist calculation of the medical certificate's currency for ICAO purposes. (See the Note below.)

2.15.2 Duration of Medical Certification

Class 1 medical certificates
For applicants with ATPL who are aged 40 years or more, ICAO demands a medical examination by a DAME every six months. That is, the currency of medical certification for this group extends for only six months from the date of the most recent medical examination.

Class 2 medical certificates
ICAO demands a medical examination by a DAME every two years for all Class 2 medical certificate holders. That is, the currency of medical certification for this group extends for only two years from the date of the most recent medical examination.

As an aide-memoire to applicants, CASA's medical certificates record the date on which the applicant's most recent medical examination was performed, to assist calculation of the medical certificate's currency for ICAO purposes. (See the Note below.)

**Note:** This has no effect on the notified currency of medical certificates when exercising licence privileges within Australian airspace.

This advice is provided to all Class 1 or Class 2 medical certificate holders whenever a CASA medical certificate is issued.
2. Medical Aspects
2.15 Differences between Australian Medical Certification and ICAO Medical Certification for International Operations

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3.1.1 Questions to be Asked of CASA Employees for Superannuation Medicals

The following are questions to be asked during Superannuation Medicals (Class 3 Medical Certificate holders and pilots to be employed by CASA).

1. Have you ever been rejected:
   a. As a risk for life insurance?
   b. For admission to any employment for health reasons?
   c. For entry into any superannuation scheme?

2. Have you ever been retired or have your services ever been terminated from any employment on medical or invalidity grounds?

3. Are you receiving, or have you ever received:
   a. A pension or any other benefit from the Commonwealth Superannuation Scheme, the Defence Force Retirement and Death Benefits Scheme, or any other government or private superannuation scheme?
   b. Workers’ or employees’ compensation?
   c. A Social Security invalidity pension or sickness benefit?
   d. A Repatriation service pension?
   e. A Repatriation disability pension? If so, please state award rate.
4. Aviation Medicine Telephone Numbers and Addresses

4.1 Telephone List

4.1.1 Aviation Medicine Telephone Contact as at December 2000

<table>
<thead>
<tr>
<th>CASA National Office (at the cost of a local telephone call)</th>
<th>131 757</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inquiries</td>
<td>(02) 6217 1641</td>
</tr>
<tr>
<td>Facsimile</td>
<td>(02) 6217 1640</td>
</tr>
</tbody>
</table>
4.2.1 Head Office

Aviation Medicine Section
Cnr Barry Drive & Northbourne Avenue
CANBERRA ACT 2601

GPO Box 1544
CANBERRA CITY ACT 2601

4.2.2 Area Offices

<table>
<thead>
<tr>
<th>Office</th>
<th>Address</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney Basin</td>
<td>PO Box CPS Condell Park</td>
<td>(02) 97803050</td>
</tr>
<tr>
<td></td>
<td>NSW  2200</td>
<td></td>
</tr>
<tr>
<td>NT and Kimberleys</td>
<td>PO Box 41196 Casuarina</td>
<td>(08) 89432999</td>
</tr>
<tr>
<td></td>
<td>NT    0811</td>
<td></td>
</tr>
<tr>
<td>South Queensland</td>
<td>39 Navigator Place Hendra</td>
<td>(07) 3632 4051</td>
</tr>
<tr>
<td></td>
<td>Qld    4051</td>
<td></td>
</tr>
<tr>
<td>North Queensland</td>
<td>PO Box 7740 Garbutt</td>
<td>(07) 4750 2671</td>
</tr>
<tr>
<td></td>
<td>Qld 4814</td>
<td></td>
</tr>
<tr>
<td>NSW Country Office</td>
<td>GPO Box 2005 Canberra ACT 2601</td>
<td>131757</td>
</tr>
<tr>
<td>Victoria Tasmania</td>
<td>PO Box 20 Moorabbin</td>
<td>131757</td>
</tr>
<tr>
<td></td>
<td>VIC  3189</td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>PO Box 126 PBC Adelaide</td>
<td>(08) 8422 2904</td>
</tr>
<tr>
<td></td>
<td>SA  5950</td>
<td></td>
</tr>
<tr>
<td>West Australia</td>
<td>GPO Box 1082 CLOVERDALE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>WA   6105</td>
<td></td>
</tr>
</tbody>
</table>
## 5. Colour Vision Testing

### 5.1 Locations for Colour Vision Testing

#### 5.1.1 Locations by State

| Australian Capital Territory | Dr D Batagol  
Dickson Park Professional Centre  
Unit 5, Cnr Cowper and Antill Street  
DICKSON ACT 2602  
Tel: (02) 6249 7177 |
|---|---|
| New South Wales | School of Optometry  
Ms Kerry Dreyer  
University of New South Wales  
KENSINGTON NSW 2033  
Tel: (02) 9385 4624 or (02) 9385 4628  
Dr P Duke  
135 Macquarie Street  
SYDNEY NSW 2000  
Tel: (02) 9247 3557 |
| Northern Territory | Dr M I Mahmood  
Darwin Private Hospital  
Rocklands Drive  
CASUARINA NT 0810  
Tel: (08) 8920 6049 |
| Queensland | Optometry Clinic, School Of Optometry  
O Block Kelvin Grove Campus  
Victoria Park Road  
KELVIN GROVE QLD 4059  
Tel: (07) 3864 5739  
Please specify on making an appointment, an "Aviation Colour Vision Test" to be supervised by Miss J Bevan.  
Dr W Talbot  
14 Fulham Rd  
PIMLICO TOWNSVILLE QLD 4812  
Tel: (07) 4775 1633 |
### 5. Colour Vision Testing

#### 5.1 Locations for Colour Vision Testing

<table>
<thead>
<tr>
<th>Queensland (cont.)</th>
<th>Captain Henry Thein (Northern Ports) Marine Operations, Queensland Transport 64-66 Tingira Street PORTSMITH CAIRNS QLD 4870 Tel: (07) 4052 7400 Fax: (07) 40351127</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appointment arrangements: Ms Wendy Loton</td>
<td>Captain Henry Thein (Northern Ports) Marine Operations, Queensland Transport 64-66 Tingira Street PORTSMITH CAIRNS QLD 4870 Tel: (07) 4052 7400 Fax: (07) 40351127</td>
</tr>
<tr>
<td>South Australia</td>
<td>Dr J L Crompton 22 Walter Street NORTH ADELAIDE SA 5006 Tel: (08) 8267 3211</td>
</tr>
<tr>
<td>Tasmania</td>
<td>Defence Forces Recruiting Medical Section Anglesea Barracks, Davie Street HOBART TAS 7000 Tel: (03) 6237 7327</td>
</tr>
<tr>
<td>Victoria</td>
<td>Victorian College of Optometry 374 Cardigan St CARLTON VIC 3053 Tel: (03) 9349 7400 <strong>Note:</strong> Please state “Aviation Colour Vision Test” when making an appointment – to be supervised by Kay Lian Dr J Parkes 54 Station Place SUNSHINE VIC 3020 Tel: (03) 9312 0800</td>
</tr>
<tr>
<td>Western Australia</td>
<td>Ms Lisa Biggs Lincoln House Suite No3 No4 Ventnor Avenue WEST PERTH WA 6005 Tel: (08) 9485 1440</td>
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### 6.1.1 List of Forms

<table>
<thead>
<tr>
<th>Former Form No.</th>
<th>New CASA Form No.</th>
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<tr>
<td>AVM 010</td>
<td>093</td>
<td>Authority Audiogram</td>
<td>J.S. McMillan</td>
</tr>
<tr>
<td>AVM 011</td>
<td>094</td>
<td>ECG</td>
<td>Phone: 02 9795 1222 (Australia) +61 2 9795 1222 (International)</td>
</tr>
<tr>
<td>AVM 006</td>
<td>097</td>
<td>Medical Questionnaire and Examination Form—R</td>
<td>P.O Box 136</td>
</tr>
<tr>
<td>AVM 012</td>
<td>098</td>
<td>Medical Questionnaire and Examination Form—O</td>
<td>Regents Park</td>
</tr>
<tr>
<td>AVM 007</td>
<td>099</td>
<td>Eye Examination Report—V</td>
<td>NSW 2143</td>
</tr>
<tr>
<td>AVM 005</td>
<td>172</td>
<td>Medical Certificate</td>
<td>Aviation Medicine Section, Canberra</td>
</tr>
<tr>
<td>AVM 008</td>
<td>755</td>
<td>Application for Appointment or Re-appointment as Designated Aviation Medical Examiner or Designated Aviation Ophthalmologist (under Regulation 6.02 of the Civil Aviation Regulations)</td>
<td>The CASA website</td>
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</table>
**BODY MASS INDEX CHART**

**Weight For Height Chart**

*(For Men and Women from 18 years onward)*

Based on Body Mass Index (BMI) in Range of 18, 20, 25, 30.

**BMI Formula**

\[
BMI = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}
\]
1. Revision History
PEAK EXPIRATORY FLOW IN NORMAL SUBJECTS


MEN

Women

STANDARD DEVIATION MEN

STANDARD DEVIATION WOMEN

48 LITRES/Min

42 LITRES/Min

IN MEN, VALUES OF PEF UP TO 150 LITRES/Min ARE LESS THAN PREDICTED, AND IN WOMEN LESS THAN 85 LITRES/Min, ARE WITHIN NORMAL LIMITS.
1. Revision History
## Coronary Heart Disease
### Risk Factor Prediction Chart

#### 1. Find Points for each Risk Factor

<table>
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<tr>
<th>Age (if Female)</th>
<th>Age (if Male)</th>
<th>HDL Cholesterol</th>
<th>Total Cholesterol</th>
<th>Systolic Blood Pres</th>
<th>Other</th>
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<td></td>
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<td>-9</td>
<td>51-52</td>
<td>7</td>
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<td>0</td>
</tr>
<tr>
<td>33</td>
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<td>53-55</td>
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<td>34</td>
<td>1</td>
</tr>
<tr>
<td>34</td>
<td>-6</td>
<td>56-60</td>
<td>9</td>
<td>35-36</td>
<td>2</td>
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<tr>
<td>35</td>
<td>-5</td>
<td>61-67</td>
<td>10</td>
<td>37-38</td>
<td>3</td>
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<tr>
<td>36</td>
<td>-4</td>
<td>68-74</td>
<td>11</td>
<td>39</td>
<td>4</td>
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<td>40-41</td>
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<tr>
<td>38</td>
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<td>1</td>
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<td>2</td>
<td>50-51</td>
<td>10</td>
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<td>44</td>
<td>3</td>
<td>52-54</td>
<td>11</td>
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</tr>
<tr>
<td>45-46</td>
<td>4</td>
<td>55-56</td>
<td>12</td>
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</tbody>
</table>

#### 2. Sum Points for all Risk Factors

\[
\text{Age ( ) + (HDL-C ( ) = Total-C ( ) + SBP ( ) + Smoker ( ) + Diabetes ( ) + ECG-LVH ( ) Point Total}
\]

**NOTE:** Minus points subtract from total

#### 3. Look up risk corresponding to point total

<table>
<thead>
<tr>
<th>Probability (%)</th>
<th>Probability (%)</th>
<th>Probability (%)</th>
<th>Probability (%)</th>
<th>Probability (%)</th>
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<tr>
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<tr>
<td>&lt;1 1 &lt;2 2</td>
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<td>28 19 33 30-34</td>
<td>&lt;1 1 &lt;2 2</td>
<td>10 2 6 19 8 16</td>
<td>28 19 33 30-34</td>
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<tr>
<td>2 1 2 12 3 6</td>
<td>20 8 18 29 20 36</td>
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<td>&lt;1 1 &lt;2 2</td>
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<tr>
<td>3 1 1 2 12 3</td>
<td>21 9 19 30 22 38</td>
<td>40-44</td>
<td>2 6</td>
<td>31 24 40 45-49</td>
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</tr>
<tr>
<td>4 1 1 2 13 3</td>
<td>22 11 23 31 24 40</td>
<td>45-49</td>
<td>10</td>
<td>25 42 50-54</td>
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<tr>
<td>5 1 3 14 4 9</td>
<td>23 12 25 32 25 42</td>
<td>50-54</td>
<td>14</td>
<td>35-59 12 16</td>
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</tr>
<tr>
<td>6 1 3 15 5 10</td>
<td>24 13 26 35-59 12 16</td>
<td>60-64</td>
<td>21</td>
<td>65-69 9 30</td>
<td>70-74</td>
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<tr>
<td>7 1 4 16 5 12</td>
<td>25 14 27 70-74 12 24</td>
<td>70-74</td>
<td>24</td>
<td>30 10</td>
<td>10 10</td>
</tr>
<tr>
<td>8 2 4 17 6 13</td>
<td>26 16 29 65-69 9 30</td>
<td>70-74</td>
<td>24</td>
<td>30 10</td>
<td>10 10</td>
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<tr>
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<td>27 17 31 70-74 12 24</td>
<td>70-74</td>
<td>24</td>
<td>30 10</td>
<td>10 10</td>
</tr>
</tbody>
</table>

**Modified from Chart by the American Heart Association, April 2002**
1. Revision History
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

Published by permission of Dr. D.R. Jones from 'Psychiatric Factors in Civil Aviation Medicine'. David R. Jones, MD, MPH. 10 January 2001. This is extracted from material provided by the FAA’s Civil Aviation Medicine Institute to its Basic Aviation Medical Examiner Course.

1. Clues that may be available before the examination begins:
   - You may know something of the reputation of the applicant in the community.
   - You may learn something from the applicant’s interaction with your office staff.

   Applicants with mental health problems may behave differently with office staff than with the examiner. Consider this if your staff points out behavioural problems or eccentricities.

2. Clues on Medical Certification form:
   - The applicant’s form contains careless or missing marks.

   Obtain the correct or missing data and ask why the mistake was made.

   - The class of certificate desired is not usual for this type of pilot.

   Find out how flying fits into the applicant’s lifestyle and plans.

   - The applicant does not live or work locally.

   Consider the type and stability of the applicant’s occupation.

   Discuss how the applicant came to pick you to do this examination.

   - Previous examinations were not completed.

   Was the applicant learning what to say or not say in order to pass?

   - Previous problems prevented certification (medical or mental health history).

   - Previous experience with health professionals was not adequately explained.

   - Pilot has had personal counselling by mental health professionals or paraprofessionals.

   - Pilot time is unusual or contains unexplained gaps.

   Ask for explanation from a high-time pilot with no date of last examination.

   - Medication history suggests significant illnesses that pilot did not note on the history questionnaire.

   Obtain an adequate history.
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

- Explanations for any medical history or findings do not make sense or seem illogical.

  *Remember Jones’s Rule of Irrational Data*: If you don’t understand what a flier means, assume it’s your problem. Ask again, clearly. If the flier tries hard to explain, you try hard to understand, and you still don’t understand, it’s probably the flier’s problem. Find out what it is. Possibilities include simple misunderstandings, English as a second language, educational deficiencies, cultural differences, limited intelligence, neurological problems, or psychiatric problems.

3. **Clues obtained during the physical examination:**

- Note anything markedly different from what you usually see in pilots: trust your instincts.

- Assess the nature of the applicant’s motivation to fly (Jones, 1986). Err on the side of caution.

  *Watch for applicants who want to be fliers rather than who want to fly.* Some see themselves as alienated from others, or inept, or weak, and wish to acquire the attributes they perceive to be those of fliers: gregarious, competent, and strong.

  *Watch for applicants who want to fly in order to prove fearlessness.*

- Look for scars without explanation obtained by history. Palpate scalp and skull for evidence of old head injury.

  *Watch for applicants whose collection of scars reflects personal recklessness.*

- Watch for applicants who are evasive about surgical scars or head injury scars. Ask about significant loss of consciousness or amnesia if pilot did not report the injury on the 8500-8.

- Observe other pertinent physical factors bearing on mental status (e.g., dress, grooming conduct, alcohol on breath, needle tracks, tattoos that suggest sociopathy, slash scars on wrists, spider nevi, hepatomegaly, blood pressure, heart rate, pupils).

- Talk with applicants before, during, and after the physical examination—inquire about home, work, education, military, or flying. Trust your judgment if you feel uneasy.
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

- Inquire about non-prescription medications, herbal remedies and dietary supplements.

  Such information may be aeromedically significant because of the nature of these remedies, or because of the symptoms for which the pilot feels they are necessary. Taking St. John’s Wort may indicate the presence of depressive symptoms, for instance.

4. What to do when you have finished:

- Ask enough questions to clarify troublesome issues.
- Obtain indicated medical data.
- If anything you encounter raises clinical questions about the applicant’s mental status, or even if you find yourself feeling uncomfortable without knowing exactly why, perform a brief mental status evaluation, using some or all of the items in the Formal Mental Status Examination (MSE) that follows.

  Note that some clinical MSEs, such as the Mini-Mental Status Examination, assess only the Sensorium rather than the entire mental status of a person.

- If you find anything that indicates clinical problems, consider necessary specialty consultations. Again, trust your judgment as an examiner, even if you can’t exactly define what’s wrong.
- Mention equivocal items in “Comments” section of Original or Renewal form for the record, even if you grant the certificate. Your data will be on record if the item arises in future examinations.
- If in doubt, call CASA AVMED for advice.
- If in serious doubt, defer; let CASA decide.
- As a last resort: make a “Don’t quote me” call to the medical authority.
AMSIT (Appearance, Mood, Sensorium, Intelligence, Thought) is adapted from a formulation by David Fuller, MD, as presented in R.L. Leon, MD. Psychiatric Interviewing: A Primer. Ed 2, New York; Elsevier/Science Publishing Co. 1989.

Appearance, Behaviour, and Speech

- **Physical Appearance**: apparent age, sex, and other identifying features. Appearance of being physically ill or in distress; and a careful description of the patient’s dress and behaviour.
- **Manner of Relating to Examiner**: placating, negativistic, seductive; motivation to work with examiner.
- **Psychomotor Activity**: increased or decreased, including jumpiness, jiggling, tapping, looking at watch, etc. Is the person hyperactive or lethargic?
- **Behavioural Evidence of Emotion**: tremulousness, perspiration, tears, clinched fist, turned-down mouth wrinkled brow, etc.
- **Disturbance of Attention**: distractibility, self-absorption.
- **Speech**: description—volume, rate (pressured or slowed), clarity, spontaneity and disturbances—mutism, word salad, perseveration, echolalia, affectation, neologisms, clang speech.

Mood and Affect

Note: “Mood is to Affect as Climate is to Weather.”

- **Mood**: use adjectives: mild (it’s there), moderate (it needs treatment), or severe (it needs treatment today!). Consider depression, elation, or other sustained emotions such as anger, fear, or anxiety.
- **Affect**: its range, intensity, lability, and appropriateness to immediate thought. To describe a normal, stable emotional status, say something like “The examinee’s mood is euthymic. Affect is unremarkable in range, intensity, and stability, and is appropriate to material being discussed.”

Sensorium

- **Orientation**: for time, place and situation.
- **Memory**: immediate (digits recall), recent (three items for 10 minutes, current events) and remote (history).
Formal Mental Status Examination

- **Calculating Ability**: serial 7’s, 11 times 13 out loud (valid only if patient is adequately educated).

- **Concentration**: spell WORLD backwards, then arrange its letters alphabetically. Repeat with EARTH.

**Intellectual Function**

Estimate current level of function as **above average**, **average**, or **below average** based on general fund of information, vocabulary, and complexity of concepts. Do not confuse **intelligence** with **education**. Can the examinee handle abstract ideas, reason by analogy, "make the connection" in conversation? Is the examinee about as smart as the examiner?

**Thought**

- **Coherence**: clear thoughts may be expressed incoherently.

- **Logic**: even clear, grammatical speech may express illogical thoughts.

- **Goal Directedness** (has a point and makes it): tangential or circumstantial thought.

- **Disturbance of Attention**: distractibility (interrupts own sentences), self-absorption.

- **Associations**: loose associations, blocking of obvious ideas or connections, flight of ideas.

- **Perceptions**: hallucinations (false perceptions), illusions, depersonalisation, distortion of body image.

- **Delusions**: false interpretations of real situations.

- **Other Content**: noteworthy memories, thoughts and feelings; suicidal or homicidal intent.

- **Judgement**: formal (specific set-piece situations such as “mailing a letter you find on the street”), social (how examinee behaves with examiner, how he or she “reads” other people—predictable, reasonable, comfortable).

- **Abstracting Ability**: ask pilot to define similarities/differences between tree-bush, child-midget, king-president, character-personality. This is more reliable than interpreting proverbs (stitch in time, bird in the hand).

- **Insight**: understanding of any personal dysfunction affecting self or others, and its need for treatment. Insight is **lacking** if there is an unacknowledged problem, **superficial** if it is only acknowledged ("It is a problem."), **moderate** if it is personalized ("I have a problem"), and **profound** if “It’s my problem, and it’s up to me to fix it.”
Criteria for the Diagnosis of Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD)

Before a diagnosis of ADD/ADHD can be made, the following criteria (from DSM IV) must be fulfilled:

A. Either (1) or (2):

1. Six (or more) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
   - Often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
   - Often has difficulty sustaining attention in tasks or play activities
   - Often does not seem to listen when spoken to directly
   - Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
   - Often has difficulty organizing tasks and activities
   - Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
   - Often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
   - Is often easily distracted by extraneous stimuli
   - Is often forgetful in daily activities.

2. Six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
   - Hyperactivity
     - Often fidgets with hands or feet or squirms in seat
     - Often leaves seat in classroom or in other situations in which remaining seated is expected
     - Often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
     - Often has difficulty playing or engaging in leisure activities quietly
     - Is often "on the go" or often acts as if "driven by a motor" often talks excessively
   - Impulsivity
     - Often blurts out answers before questions have been completed
     - Often has difficulty awaiting turn
     - Often interrupts or intrudes on others (e.g. butts into conversations or games)
Criteria for the Diagnosis of Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g. at school [or work] and at home).

D. Clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g. Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

Specify Types:

- **Attention-Deficit/Hyperactivity Disorder, Combined Type:** if both Criteria A1 and A2 are met for the past 6 months.

- **Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type:** if Criterion A1 is met but Criterion A2 is not met for the past 6 months.

- **Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type:** if Criterion A2 is met but Criterion A1 is not met for the past 6 months.
Note: The Revision History shows the most recent amendment first. Scroll down the table to view details of previous amendment information.

<table>
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Application for Appointment or Re-appointment as Designated Aviation Medical Examiner or Designated Aviation Ophthalmologist
(Under Regulation 6.02 of the Civil Aviation Regulations)

Forward completed form and signed declaration to the Director of Aviation Medicine, GPO Box 1544, Canberra City, ACT 2601, Fax 02 62171640, e-mail avmed@casa.gov.au.

Tick as appropriate

- [ ] Designated Aviation Medical Examiner (Sign Declaration at page 3)
- [ ] Designated Aviation Ophthalmologist (Sign Declaration at page 5)

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The Federal Government TimeSaver initiative aims to assess the time taken to complete Government Forms. Please indicate the approximate time taken to complete this form. Hrs Mins

form 755 01/2004 application medicine-application-appointment or re-appointment as DAME or DAO to CASA
CONDITIONS OF APPOINTMENT

CASA DESIGNATED AVIATION MEDICAL EXAMINER (DAME)

1. Designation is for a period of four years unless earlier terminated, and is renewable.
2. Designation lapses if the aviation medical examiner ceases to practise in the locality for which he/she is designated.
3. Designation does not extend to the DAME’s partners, assistants or locums unless written consent from the CASA Director of Aviation Medicine/Principal Medical Officer is obtained in advance of the requirement.
4. The DAME is required:
   i. to conduct himself/herself in a professional manner and in accordance with the Australian Medical Association’s Code of Ethics (details of which are available from the Association’s web page www.ama.com.au);
   ii. to be satisfied as to the identity of each applicant;
   iii. to examine personally each application presenting for examination;
   iv. to devote such time and skill to the examination of applicants as is necessary to elicit a careful history and to conduct a full and thorough examination;
   v. at the conclusion of each medical examination to forward the report to CASA promptly;
   vi. if the holder of a medical certificate tells a DAME about a medical condition that is relevant to aviation safety, the DAME must inform CASA of the condition within 5 working days;
   vii. to keep informed of, and follow the relevant standards, techniques and administrative procedures associated with medical examinations detailed in The DAME Handbook and in the DAME Newsletter published by CASA on its website;
   viii. to undertake continuing training, acceptable to CASA, in Aviation Medicine;
   ix. to notify CASA if absent from active practice for more than 4 weeks;
   x. to notify CASA of any change of address, of contact details, or of cessation of practice;
   xi. on cessation of appointment as a DAME, to return the DAME stamp and to destroy or return any unused examination forms to CASA;
   xii. to acknowledge CASA’s right to terminate Designation should the DAME conduct himself/herself in a manner that is detrimental to the interests of CASA or breach any of these Conditions of Appointment;
   xiii. (Australian applicants only) to effect and maintain membership of the Australasian Society of Aviation Medicine (ASAM) or other approved aviation medical/scientific organization;
   xiv. to authorise CASA to publish in the DAME Newsletter and the CASA website the DAME’s cessation of practice, resignation of appointment as a DAME or termination of appointment as a DAME by CASA;
xv. to authorise the regulatory authority of any ICAO Contracting State that designated or
designates the DAME to disclose to CASA information about the DAME’s performance and
competence as a medical examiner; and

xvi. to authorise CASA to disclose to the regulatory authority of another ICAO Contracting State
that designates medical examiners for that State that has designated the DAME or to which the
DAME has applied to be designated, information about the DAME’s performance as a
medical examiner.

5. The DAME is required to provide the following facilities and equipment:

   i. a suitable examination room and general diagnostic equipment, including an accurate
      sphygmomanometer;
   
   ii. simple urine testing facilities;
   
   iii. Ishihara pseudoisochromatic chart (24 plate) for colour vision testing;
   
   iv. visual acuity charts(s) for use at 6 metres;
   
   v. N series test types for near vision testing;
   
   vi. ophthalmoscope;
   
   vii. a height measuring scale (cm);
   
   viii. weighing scales (kg);
   
   ix. an electrocardiograph machine which complies with the Australian Standard, or a reliable
      local source for obtaining ECGs when required. (A specimen tracing on a normal subject
      from this machine may be required); and
   
   x. a suitable computer, document scanner, modem and software package for communication
      with CASA. (Details will be notified from time to time).

Declaration by Applicant

I have read the Conditions of Appointment (‘the Conditions’) set out above and, if designated, I agree
to accept the Conditions. Upon my designation, this declaration shall constitute my acknowledgment
for the purposes of subparagraph 4 (xii) and respective authorisation for purposes of subparagraphs 4
(xv) and (xvi) of the Conditions.

Applicant’s Signature                                      Date ........................................../ ................../ ........

Name............................................................... (Please use Block Capitals)
CONDITIONS OF APPOINTMENT

CASA DESIGNATED AVIATION OPHTHALMOLOGIST (DAO)

1. Designation is for a period of four years unless earlier terminated, and is renewable.
2. Designation lapses if the aviation medical examiner ceases to practise in the locality for which he/she is designated.
3. Designation does not extend to the DAO’s partners, assistants or locums unless written consent from the CASA Director of Aviation Medicine/Principal Medical Officer is obtained in advance of the requirement.
4. The DAO is required:
   i. to conduct himself/herself in a professional manner and in accordance with the Australian Medical Association’s Code of Ethics (details of which are available from the Association’s web page www.ama.com.au);
   ii. to be satisfied as to the identity of each applicant;
   iii. to examine personally each application presenting for examination;
   iv. to devote such time and skill to the examination of applicants as is necessary to elicit a careful history and to conduct a full and thorough ophthalmic examination;
   v. at the conclusion of each medical examination to forward the report to CASA promptly;
   vi. to keep informed of, and follow the relevant standards, techniques and administrative procedures associated with ophthalmological examinations detailed in The DAME Handbook and in the DAME Newsletter published by CASA on its website;
   vii. to notify CASA if absent from active practice for more than 4 weeks;
   viii. to notify CASA of any change of address, of contact details, or of cessation of practice;
   ix. on cessation of appointment as a DAO, to return the DAO stamp and to destroy or return any unused examination forms to CASA;
   x. to acknowledge CASA’s right to terminate Designation should the DAO conduct himself/herself in a manner that is detrimental to the interests of CASA or breach any of these Conditions of Appointment;
   xi. (Australian applicants only) to effect and maintain membership of the Australasian Society of Aviation Medicine (ASAM) or other approved aviation medical/scientific organization;
   xii. to authorise CASA to publish in the DAME Newsletter and the CASA website the DAO’s cessation of practice, resignation of appointment as a DAO or termination of appointment as a DAO by CASA;
   xiii. to authorise the regulatory authority of any ICAO Contracting State that designated or designates the DAO to disclose to CASA information about the DAO’s performance and competence as a medical examiner; and
xiv. to authorise CASA to disclose to the regulatory authority of another ICAO Contracting State that designates medical examiners for that State that has designated the DAO or to which the DAO has applied to be designated, information about the DAO’s performance as an ophthalmologist examiner.

Declaration by Applicant

I have read the Conditions of Appointment (‘the Conditions’) set out above and, if designated, I agree to accept the Conditions. Upon my designation, this declaration shall constitute my acknowledgment for the purposes of subparagraph 4 (x) and respective authorisation for purposes of subparagraphs 4 (xiii) and (xiv) of the Conditions.

Applicant’s Signature  

Date ................................../ ............/ ..............

Name...........................................................................................................(Please use Block Capitals)
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1.1 Introduction

1.1.1 Abbreviations Used in this Handbook.

- ARN: Aviation Reference Number
- AMSANZ: Aviation Medical Society of Australia and New Zealand
- ASAM: Australasian Society of Aerospace Medicine
- AsMA: Aerospace Medicine Association
- ATPL: Airline Transport Pilot Licence
- CAA: Civil Aviation Act
- CAR: Civil Aviation Regulations
- CASR: Civil Aviation Safety Regulations
- CASA: Civil Aviation Safety Authority (Australia)
- DAEE: Designated Aviation Eye Examiner
- DAME: Designated Aviation Medical Examiner
- DAO: Designated Aviation Ophthalmologist
- FAA: Federal Aviation Administration (US)
- IAASM: International Academy of Aviation and Space Medicine
- ICAO: International Civil Aviation Organization
- JAA: Joint Aviation Authorities (Europe)
- MRS Online: Medical Records System Online
- PMO: Principal Medical Officer

1.1.2 The Origin and Development of the CASA DAME Handbook

CASA and its antecedent organizations have published advice for DAMEs concerning practical and administrative aspects of their duties for many years. The most comprehensive and semi-permanent repository of such advice has been CASA’s DAME Handbook, which originated in the late 1980s. The original hard copy publication was an amalgam of advice derived from many sources. Some of the material can be traced back to directives produced by the Aviation Medicine Branch within the Australian Department of Civil Aviation during the 1950s. A considerable debt is due also to earlier published advice from other Regulators, particularly CAA (New Zealand) and the US FAA.

The DAME Handbook was never intended to be completely prescriptive or authoritative, particularly in its more clinically oriented sections. The principal purpose of creating (and maintaining) such a publication is to provide a compact ready reference for DAMEs and anyone else in CASA’s procedures related to aeromedical certification. Soon after The DAME Handbook was first published, a need for further explanation and elaboration of its contents became obvious, leading to creation of periodic DAME Newsletters issued by the Director of Aviation Medicine. Jointly, these publications aspired to answer DAMEs’ FAQs and to provide guidance that would reduce errors and facilitate expeditious handling of the medical examinations and reports concerning applicants prepared for CASA.
By 1998, The DAME Handbook was showing distinct signs of nearing the end of its useful life. Parts of the Handbook had been so qualified and specifically interpreted that it was sometimes difficult for DAMEs and even for staff of CASA Aviation Medicine Section to understand all requirements. Thereafter, an interim revision was produced to remove the more glaring inconsistencies and contradictions that existed between it and some DAME Newsletters. At the same time, CASA had determined that all its future public documents should be created and maintained in electronic format, available on-line, rather than as hard copy. This decision had other major implications, particularly the accessibility of all such documents to unrestricted public scrutiny.

The first on-line version of The DAME Handbook was posted on CASA’s website in May 1999. It represented only an interim answer to a continuing need to provide succinct, accessible, relevant advice to DAMEs and other interested persons. At that stage, much of its contents still derived from the reverence accorded to our authoritative forebears, who had not been constrained to reach decisions on evidence-based medicine principles. At least the style was brought into line with modern CASA standards.

The next priority was to review the contents of the system-based chapters in Section 2. This task has continued ever since. CASA intends that this process will continue indefinitely, to ensure relevance and currency of guidance provided. CASA is committed to procedural transparency and to meeting best-practice standards in all of its activities. Aviation Medicine Section’s accelerating, continuous review of The DAME Handbook reflects that commitment and will result in the availability of a better, cross-referenced and more practically useful guide.

1.1.3 Appointment and Legal Status of Designated Aviation Medical Examiners (Target Audience of the Handbook)

In order to utilise a Flight Crew Licence or Air Traffic Service Licence, it is necessary to have a medical clearance at a standard appropriate to the licence held. Within Australia, designated medical practitioners perform the necessary medical examinations for the Aviation Medicine Section of the Civil Aviation Safety Authority.

Designated medical practitioners perform medical examinations to meet the provisions of the Civil Aviation Act, the Civil Aviation Regulations and the Civil Aviation Safety Regulations. The practitioners approved to perform these examinations are known as Designated Aviation Medical Examiners (DAMEs) or Designated Aviation Ophthalmologists (DAOs). They are responsible to the Principal Medical Officer, who oversees the administration of the DAME and DAO systems.

In order to meet CASA’s needs and the needs of applicants for medical certification, appropriately qualified holders of certain positions are also permitted to undertake the duties of DAMEs and DAOs.
In order to meet CASA’s needs and the needs of applicants who are distant from regular examiners for medical certification, appropriately qualified individual practitioners may also be permitted, as needed, to undertake the duties of DAMEs and DAOs.

Certain optometrists are also approved to perform all those examinations usually carried out by DAOs. These practitioners are known as Designated Aviation Eye Examiners (DAEEs).

To request appointment or reappointment as a DAME, DAO or DAEE, complete a CASA application form (Form 755). Intending applicants may wish first to obtain additional information from one of CASA’s DAME Liaison Officers.

1.1.4 Qualifications and Experience

1. Medical practitioners designated by CASA to perform Air Crew and Air Traffic Services medical examinations must be registered with the medical registration authority of the State or Territory of the Commonwealth or country in which they reside.

2. As a signatory to the Chicago Convention, Australia is bound to appoint as DAMEs only medical examiners that have had appropriate training in aviation medicine. Possession of the Australian Certificate in Civil Aviation Medicine or similar qualification is the normal minimum requirement for appointment as a DAME. A list of courses that CASA will routinely approve for this purpose is available on the CASA website. Applicants for appointment as DAMEs on the basis of completion of other courses should contact CASA’s DAME Liaison Officers to discuss requirements.

Prior to appointment, and periodically thereafter, DAMEs are required to give an undertaking to abide by specified conditions of appointment. This is contained in Form 755.

3. DAMEs are required to attend periodic training seminars or courses in aviation medicine approved by CASA. Routinely approved seminars or courses will be posted on the CASA website. Attendance at an aerospace medicine scientific meeting such as those conducted by ASAM (formerly AMSANZ), AsMA, IAASM, FAA, CASA or similar bodies is sufficient to meet this requirement. DAMEs may also apply individually for approval of other appropriate training activities. Documented attendance at an appropriate activity is usually required at least once every two years.

Because DAOs and DAEEs examine and report only on applicants’ vision, they are encouraged but not required to undertake appropriate training in aviation medicine. However, these practitioners are required to undertake continuing professional education approved by CASA. (CASA will accept evidence of completion of continuing professional education required by an appropriate professional college, association or registration authority as satisfying this requirement).
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4. DAMEs resident in Australia are required to effect and maintain membership of the Aviation Medical Society of Australia and New Zealand/the Australasian Society of Aerospace Medicine.

5. DAOs and DAEEs resident in Australia are required to effect and maintain membership/associate membership, as appropriate, of the Aviation Medical Society of Australia and New Zealand/the Australasian Society of Aerospace Medicine.

6. All designated examiners should, as far as possible, be aware of the conditions in which applicants for medical certification are employed or operate. CASA encourages designated examiners to acquire practical experience of these conditions.

7. Designation is usually granted only to practitioners in full-time practice and for one address. Continued designation is subject to the terms set out in the application for appointment in Form 755.

1.1.5 Duration of Designation

CASA appoints DAMEs, DAOs and DAEEs for periods specified at the time of appointment. They are required to re-apply for appointment at the end of each such period.

Designation lapses if the designated examiner ceases to practise at the location for which he/she is appointed, unless CASA approves a changed practice location.

Designation lapses if the designated examiner fails to observe the relevant conditions of appointment as set out in Form 755.

Designation does not automatically extend to a designated examiner’s partners, assistants, locums or successors without prior CASA approval, which should be sought well in advance of any anticipated need. Designated examiners who wish to have other practitioners act in their stead should contact CASA to ascertain precise requirements. For DAMEs’ proposed locums, completion of an approved aviation medicine course is a prerequisite for approval. CASA does not usually approve locum appointments for periods of less than four weeks.
1.1.6 Duties and responsibilities of DAMEs

1. On becoming aware of any condition of potential aeromedical significance in the holder of or applicant for an aviation medical certificate, the DAME must notify CASA of full details within five working days. Note that certain minor conditions (see 1.4.5 Temporary Incapacity of Certificate Holders) need not be reported until the applicant’s next-following routine medical assessment. CASR 67.125 refers.

2. The DAME must be satisfied as to the identity of each applicant for medical certification. Unless the DAME personally knows the applicant, he/she must sight a photographic identity document of the applicant. Subsequently, the DAME is required to certify that he/she has formally identified each applicant. CASR 67.170 refers.

Note: It is prudent to remind applicants, when making appointments, of the need to bring photographic identification to their appointments.

3. The DAME is to answer the medical history questions in the medical assessment report, in conjunction with the applicant, and ensure that the applicant understands each such question.

4. The DAME is to examine personally each applicant presenting for examination, and record the results in the medical assessment report.

5. The DAME is to perform or arrange for any investigations or specialist assessments that are necessary for the examiner to be satisfied that the applicant meets the medical standard for the class of medical certificate sought. See Examiners With Farnsworth Lantern Testing Facilities on the CASA website.

6. The DAME is to comply with CASA’s directions concerning completion and lodgement of medical reports.

7. The DAME is to forward to CASA each medical report or ancillary report received concerning an applicant for medical certification. In usual circumstances, all such reports should be dispatched within 14 days of receipt unless the DAME has contacted CASA and a different schedule has been agreed.

8. The DAME is to ensure that the applicant signs the required statement on completion of the examination. Thereafter, the DAME is to complete his/her details on the statement, and forward it to CASA within the specified period. Under no circumstances should the statement be given to the applicant to dispatch to CASA.
9. The DAME is to maintain an up-to-date knowledge of the relevant civil aviation medical standards and techniques required by CASA and by ICAO, and also interpret these requirements for applicants for medical certification. In particular, the DAME is to acknowledge promptly advice from CASA on publication of DAME Newsletters or of changes to the DAME Handbook.

10. The DAME is to notify CASA promptly of any change of address, change of e-mail address, change of telephone number, or absence from practice for periods of four weeks or more.

11. The DAME is to display his/her certificate of appointment as a DAME in his or her professional rooms.

12. The DAME is to return his/her official stamp to CASA on cessation of appointment.

13. The DAME is to use his/her official stamp only for CASA-related purposes. In particular, it should not be used as a means of certifying completion of any medical examinations not required by CASA.

14. CASA requests that DAMEs inform the Authority of details when they learn of the death of any medical certificate holder. (Although this is not a requirement of appointment, such notice is useful for CASA’s monitoring of the health of Australia’s aviation workforce.)

### 1.1.7 Duties and Responsibilities of DAOs and DAEEs

**CASR 67.125**

1. On becoming aware of any condition of potential aeromedical significance in the holder of or applicant for an aviation medical certificate, the DAO or DAEE must notify CASA of full details within five working days. Note that certain minor conditions need not be reported until the applicant’s next-following routine medical assessment (see 1.4.5 Temporary Incapacity of Certificate Holders). CASR 67.125 refers.

**CASR 67.170**

2. The DAO or DAEE must be satisfied as to the identity of each applicant for medical certification. Unless the DAME or DAEE personally knows the applicant, he/she must sight a photographic identity document of the applicant. Subsequently, the DAO or DAEE is required to certify that he/she has formally identified each applicant. CASR 67.170 refers.

**Note:** It is prudent to remind applicants, when making appointments, of the need to bring photographic identification to their appointments

3. The DAO or DAEE is to examine personally each applicant presenting for examination, and record the results in the eye examination report.
4. The DAO or DAEE is to comply with CASA’s directions concerning completion and lodgement of eye examination reports. See *Examiners With Farnsworth Lantern Testing Facilities* on the CASA website.

5. The DAO or DAEE is to ensure that the applicant signs the required statement on completion of the examination, enter his/her details on the statement, and forward it to CASA within the period specified.

6. The DAO or DAEE is to maintain an up-to-date knowledge of the relevant civil aviation medical standards and techniques required by CASA and by ICAO, and also interpret these requirements for applicants for medical certification. In particular, the DAO or DAEE is to acknowledge promptly advice from CASA on publication of DAME Newsletters or of changes to the DAME Handbook.

7. The DAO or DAEE is to notify CASA promptly of any change of address, change of e-mail address, change of telephone number, or absence from practice for periods of four weeks or more.

8. The DAO or DAEE is required to display his/her certificate of appointment as a DAO or DAEE in his or her professional rooms.

9. The DAO or DAEE is to return his/her official stamp to CASA on cessation of appointment.

10. The DAO or DAEE is to use his/her official stamp for CASA-related purposes only.

### 1.1.8 Facilities and Equipment

DAMEs are required to provide the facilities and equipment as set out in Form 755 under *Conditions of Appointment of DAMEs* – paragraph 5.

DAOs and DAEEs are required to provide appropriate facilities and equipment for eye examinations as required by CASA.

### 1.1.9 Powers under the Civil Aviation Regulations

The Civil Aviation Safety Regulations confer the following powers on DAMEs:

- Extension of the period in force of a current medical certificate, unless it bears the condition ‘Renew by CASA only’. Refer CASR 67.210.
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Renewal of the validity of a medical certificate that expired within three months of the examination, unless it bears the condition ‘Renew by CASA only’. Refer CASR 67.225.

Direction of an applicant for medical certification to provide or to authorise release by other parties of any information necessary to determine whether the applicant meets the required medical standard for certification. Refer CASR 67.225(3).

Certification of continuing fitness for duty of pregnant air traffic control staff during late pregnancy. Refer CASR 67.235(2).

Certification of return of fitness to exercise privileges of a licence in a medical certificate holder who has been affected by a medically significant condition for a prescribed period. Refer CASR 67.265(4) and CASR 67.270(3).

1.1.10 Responsibilities Under the Civil Aviation Regulations

The Civil Aviation Safety Regulations confer the following responsibilities on DAMEs:

- To comply with any applicable requirements contained in the DAME Handbook
- To observe of the Code of Ethics of the Australian Medical Association
- To attend appropriate continuing education activities relevant to their aviation medicine practice
- To report to CASA within five working days any safety-relevant condition detected in an applicant
- To complete and promptly forward to CASA a Notice/Declaration/Consent/Authorisation: Medical Certification of Applicants form in respect of each applicant examined. Note that part of this process requires the DAME to certify the identity of the applicant.

Further details appear in CASRs 67.060 and 67.170.

The Civil Aviation Safety Regulations confer the following responsibilities on DAOs and DAEEs:

- To comply with any applicable requirements contained in the DAME Handbook.
- To observe of the Code of Ethics of the Australian Medical Association or the Optometrists’ Association Australia, as appropriate.
- To report to CASA within 5 working days any safety-relevant condition detected in an applicant.
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Further details appear in CASRs 67.080 and 67.170.

When CASA (or a DAME, DAO or DAEE) refers an applicant to a specified medical specialist of its / the referring practitioner’s choice for investigation and / or report, CASA expects that the medical specialist concerned will observe an appropriate, ethical level of professional impartiality. Supreme Court of the ACT Practice Direction No 3 of 2002 (and similar court directives issued in other Australian jurisdictions) provides relevant guidance. If in doubt as to requirements, referring professionals are invited to contact CASA Aviation Medicine Section to discuss the matter.

1.1.11 Protection Under the Civil Aviation Regulations

Civil Aviation Safety Regulations provide complete indemnification against civil or criminal liability for any medical practitioner or other nominated person or organisation that, in good faith, performs an indemnified act in accordance with the Regulations. Refer CASR 67.140.

For this purpose, ‘an indemnified act’ means any act whereby a DAME, other medical practitioner or other specified person (including a DAEE) advises CASA of any concerns over the ability of a medical certificate holder or applicant to meet a required medical standard for such certification. CASA requires such advice to be provided in writing.

1.1.12 Fees

CASA does not set or recommend fees for general DAME, DAO or DAEE examinations.

In the case of CASA employees who are required to hold aviation licences to perform their duties and are thus entitled to reimbursement from CASA for the cost of examinations and any related tests, CASA will reimburse fees determined as reasonable by the CASA PMO. In general, CASA will accept as reasonable, fees that closely approximate the fees recommended in the current edition of the *AMA List of Medical Services & Fees*. Any additional amounts will be the responsibility of the examinee. In cases of doubt or unusual complexity, examiners are invited to discuss the matter with the CASA PMO. Note that CASA will not accept responsibility for any treatment expenses incurred by its employees arising from findings in the course of routine assessments for medical certification.

When presenting for assessment, CASA employees should either present a CASA claim for payment form, with details of where to send it to obtain payment, or personally pay for the consultation and claim reimbursement from CASA. Examiners should not send accounts to Aviation Medicine Section unless this has been previously agreed as the result of a specific request from Aviation Medicine Section.
Where a DAME has been required to expend additional time and effort for a CASA employee in arranging specialist referrals or investigations, obtaining and interpreting copies of reports, or on similar activities, an approach to the CASA PMO for a higher-than-normal fee may be considered.

Additional Examinations

Where additional consultations or investigations are necessary to ascertain if an applicant for medical certification meets the required medical standard, the applicant is usually responsible for meeting any costs involved. If such tests are undertaken principally for screening purposes, they will not generally be eligible for rebate from the Health Insurance Commission (HIC). However, if additional tests are required to elucidate a health problem for which medical opinion, investigation or treatment is clinically necessary, these should be rebatable. Affected applicants should be advised to discuss their individual cases with the HIC.

In the case of CASA employees who are required to hold aviation licences to perform their duties and are thus entitled to reimbursement from CASA for the cost of examinations and any related tests, CASA will reimburse fees determined as reasonable by the CASA PMO for additional consultations or investigations necessary to ascertain if the employee meets the required medical standard. In general, CASA will accept as reasonable, fees that closely approximate the fees recommended in the current edition of the *AMA List of Medical Services & Fees*. Any additional amounts will be the responsibility of the examinee. Note that CASA will not accept responsibility for any treatment expenses incurred by its employees arising from findings in the course of routine assessments for medical certification.
1.2.1 Licences – General

Aircrew and air traffic services licences are issued to applicants who have met the relevant technical and theoretical standards. Once a licence is issued, it continues in effect indefinitely. A valid medical certificate appropriate for the class of licence must accompany the licence for the licence holder legally to exercise the privileges of the licence.

1.2.2 Classes of Medical Certificates for Licence Types

There are three medical standards relating to the various types of licences held. These three standards relate to Class 1, 2 and 3 Medical Certificates.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Applicable to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>All professional technical aircrew of powered aircraft, and is required for issue of Airline Transport Pilot Licence, Commercial Pilot Licence, Flight Engineer or Flight Navigator Licences.</td>
</tr>
<tr>
<td>Class 2</td>
<td>Student Pilot, Private Pilot, Commercial Pilot Balloons and Flight Radio Operator Licences.</td>
</tr>
<tr>
<td>Class 3</td>
<td>Air Traffic Control staff.</td>
</tr>
</tbody>
</table>

1.2.3 Duration of Validity

See 1.4.7 Special Periodic Examinations Required.

Unless otherwise advised by the Aviation Medicine Section:

<table>
<thead>
<tr>
<th>Class 1</th>
<th>Medical Certificate is valid for one year (but see 1.4.7 Special Periodic Examinations Required).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 2</td>
<td>Medical Certificate is valid for four years, for applicants less than 40 years of age on the day of issue, and in all other cases for two years.</td>
</tr>
<tr>
<td>Class 3</td>
<td>Medical Certificate is valid for two years.</td>
</tr>
</tbody>
</table>

Where an applicant’s medical condition is under review, the duration of Medical Certificate validity may be varied at the discretion of the Principal Medical Officer.
1.2.4 Special Reports and Tests Required for Medical Certification

<table>
<thead>
<tr>
<th>Class 1</th>
<th>Initial Issue</th>
<th>ECG, audiogram, estimation of fasting serum lipids and fasting blood glucose and an examination by CASA Designated Aviation Ophthalmologist.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Renewals</td>
<td>ECGs are required at the first renewal after the 25th, 30th, 32nd, 34th, 36th, 38th and 40th birthdays, and annually thereafter.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Audiograms are required at the first renewal after the 25th birthday and every fifth birthday thereafter.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Estimation of fasting serum lipids and of fasting blood glucose is required at the first renewal after the 25th birthday and every fifth birthday thereafter.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Examination by CASA Designated Aviation Ophthalmologist at age 60 and at two-yearly intervals thereafter.</td>
</tr>
</tbody>
</table>

| Class 2 | Where an applicant for original medical certification has a visual acuity < 6/60 in either eye, an ophthalmic report from an ophthalmologist or optometrist (preferably a DAO or DAEE) is required. There are no other special requirements, except where an examiner determines a clinical indication exists. |

<table>
<thead>
<tr>
<th>Class 3</th>
<th>Initial Issue</th>
<th>ECG, audiogram, estimation of fasting serum lipids and fasting blood glucose and an examination by CASA Designated Aviation Ophthalmologist.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Renewals</td>
<td>ECGs are required at the first renewal after the 25th and 30th birthdays and every two years thereafter, ie, at every subsequent routine examination.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Audiograms are required at the first renewal after the 25th birthday and then at each renewal after every fifth successive birthday.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Estimation of fasting serum lipids and of fasting blood glucose is required at the first renewal after the 25th birthday and then at each renewal after every fifth successive birthday.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Examination by CASA Designated Aviation Ophthalmologist at age 60 and at two-yearly intervals thereafter.</td>
</tr>
</tbody>
</table>

See also section 1.4.1 Electrocardiographs.
1.3.1 General Matters

From 2003, CASA has adopted a medical assessing system intended to automate the process of medical certification to the greatest extent practicable. The technological platform for this process is a computer-based system known as the CASA Medical Records System Online (MRS Online). Intended future development of MRS Online will further improve the speed and accuracy of medical certification.

Once MRS Online became fully operational, CASA decommissioned the former paper-based medical reporting system, which relied on optical scanning to capture and store data from routine medical assessments. CASA no longer maintains a capability to process paper-based routine reports of medical assessments. Consequently, any paper-based medical examination and report forms received are returned to the originator and a notice sent to the examinee advising him/her that the medical report has not been processed and that another is required. Note that further exercise of licence privileges is not permitted until medical certification via MRS Online is complete.

Pending further development of MRS Online, hard copies of applicant statement and examiner certification forms are still required.

CASA continues to accept hard copies of other medical reports, particularly ECGs, because of the time taken to transmit such documents electronically from some computer servers. However, CASA’s preference is for such documents to be scanned and transmitted electronically as attachments to the medical assessment form. In the near future, this will become the only available means for their lodgement.

If, for any reason, an examiner is unable to transmit a medical assessment form to CASA electronically, it is temporarily possible for an examination form to be mailed to the examiner on diskette. Once completed, the diskette can be returned and CASA can then load it manually into MRS Online. CASA does not intend to support this option in the long term because it vitiates many of the efficiency benefits available from MRS Online.

1.3.2 Medical and Ophthalmological Assessment Forms

Prior to undertaking any aeromedical examination, the examiner is to inform each applicant of the possible legal consequences of a deliberate false statement made with the intention of obtaining a medical certificate (see CASR 67). Thereafter, the examiner should obtain the applicant’s signature and complete the applicant statement and examiner certification form and record all relevant historical details obtained from the applicant.
CASA requires that the DAME personally ask the applicant the questions in the medical history section of the medical assessment report, then personally record the answers given. This allows the DAME to assess the applicant’s understanding of the questions and to provide any necessary explanations.

CASA similarly requires that the DAO/DAEE personally ask the applicant the questions in the medical history section of the eye assessment report, and personally record the answers given. This allows the DAO/DAEE to assess the applicant’s understanding of the questions and to provide any necessary explanations.

Slightly different historical data are required from applicants for original medical certification, where fuller details are sought, and from applicants for renewal medical certification. MRS Online automatically generates the appropriate questionnaire for each examination on the basis of its own records and/or input data.

MRS Online automatically generates an original medical history questionnaire whenever a period of 5 years or longer has passed since the applicant’s last medical assessment report.

Where the holder of an existing class 2 medical certificate applies for medical certification at class 1 or 3 level, MRS Online will automatically generate an original medical history questionnaire.

1.3.3 The Medical Certificate

Civil Aviation Safety Regulations require an aviation licence holder to have a current, valid medical certificate appropriate to the class of licence held in order to validate the licence holder’s exercise of privileges conferred by the licence. That is, in order to exercise the privileges of an aviation licence, the licence holder must have both a licence and a valid medical certificate for the class of licence.

The medical certificate confirms that the applicant has been medically assessed, details the class of medical certificate held, the validity date, and confirms either that the required medical standard is met or details of any restrictions imposed by CASA which affect the medical certificate’s validity and therefore the use of the licence (refer 1.5.2 Frequently Used Conditions Endorsed on Medical Certificates). For professional licence holders, it also notes the dates of most recent additional examinations required (refer 1.4.6 Additional Investigations and Specialist Opinions).
CASR 67.220, 67.225  

DAMEs are not authorised to issue interim original medical certificates. Where permitted by Civil Aviation Safety Regulations (see CASR 67.220 and 67.225) they may revalidate an existing current medical certificate or one that has expired for less than three months (see following Section). Legally, every medical certificate is a new medical certificate. The ‘new’ medical certificates issued by DAMEs under provisions of CASR 67.225 actually refer to revalidated medical certificates that have expired for less than three months.
1.3.4 Medical Certificate Revalidation

DAMEs are not permitted to revalidate medical certificates endorsed ‘Renew by CASA only’. Affected applicants are encouraged to return to the DAME for early review, leaving adequate time for CASA to receive the periodic medical assessment and any other required reports and to make a determination on fitness for renewed medical certification.
On completion of the medical assessment, provided that the applicant appears to meet the required medical standard and provided the medical certificate has not been endorsed ‘Renew by CASA only’, the DAME may revalidate an applicant’s medical certificate only, as follows (refer CASR 67.220):

- If the applicant’s medical certificate has not expired and the assessment is conducted more than 28 days before the expiry date shown on the certificate—for up to two calendar months from the date of the assessment. (But see ‘Exception for ATPL recertification’ below).

- If the applicant’s medical certificate has not expired and the assessment is conducted within 28 days preceding the expiry date shown on the certificate—for up to two calendar months beyond the expiry date shown on the certificate.

- If the applicant’s medical certificate has expired, and the assessment is conducted within three calendar months of the expiry date shown on the certificate—for up to two calendar months from the date of the assessment.

To revalidate the medical certificate, the following endorsement is required:

‘Examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (the appropriate date to be inserted is determined according to instructions in the preceding paragraph):

DAME’s signature, date, DAME stamp.

Note: Any specialist assessments required in connection with a medical certificate renewal examination need not be performed within 28 days preceding the medical certificate’s expiry date. Guidance on CASA’s usual approach to currency of specialist reports and other investigations appears under 1.8 Frequently Asked Questions.

Exception for ATPL recertification.

Some CASA medical standards differ from those required by ICAO (refer Section 2.15). In particular, ATPL holders aged over 40 but under 60 may receive Australian class1 medical certification for 12 months, while ICAO countenances only six months. Because many of this group operate on international routes, CASA advises (and airlines require) that their medical certification is ICAO compliant.
Such applicants will often return for reassessment within the first 6 months of a medical certificate, which is valid for 12 months. In this circumstance, the DAME should endorse the applicant’s medical certificate as follows.

‘Re-examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (this will usually be the date 2 months after the assessment date)
signature, date, DAME stamp

Subsequently, in the usual course of events, CASA will issue a new class 1 medical certificate valid for a further 12 months from the date of assessment. Alternatively, CASA may issue a new medical certificate that has the effect of extending validity for six months longer than the current certificate’s expiry date. This situation will persist while ever the medical certificate holder operates as an ATPL in international air space.

**Note:** There are a number of other differences between CASA and ICAO medical standards. These particularly concern the periods of validity for medical certificates and the frequency of certain routinely required investigations or examinations. Full details likely to be of relevance to Australian examiners will be notified from time to time in *DAME Newsletters*. Those currently of interest are shown in section 2.15 of this manual. For practical purposes, only medical certificate holders who intend to exercise the privileges of licensure in other ICAO contracting states will be affected by these differences.

### 1.3.5 Assessments Other than Pass Assessments

Only CASA’s Principal Medical Officer (PMO) has the delegated power to cancel an applicant’s medical certificate(s).

Only CASA’s PMO and other CASA medical staff have the delegated power to suspend an applicant’s medical certificate(s).

A DAME may only revalidate the medical certificate of an applicant who appears to meet the required medical standard and where the medical certificate does not bear the endorsement ‘Renew by CASA only’. If a DAME has any concerns about an applicant meeting the required medical standard, he/she must decline to revalidate the medical certificate and refer the matter to CASA for determination. Relevant specialist opinions and/or investigations should be obtained and the results forwarded to CASA, together with the DAME’s opinion concerning the applicant’s fitness for certification.
To assist CASA’s consideration of applicants where there is doubt about ability to meet the required medical standard, DAMEs should avoid vague descriptive terms in their reports. Expressions such as ‘brief’, ‘infrequent’, ‘mild’, ‘some’ or similar convey no meaningful information. CASA recommends the “6W mnemonic”.

WHAT 1: What happened? (Detail signs and symptoms that led to the consultation, procedure performed etc).

WHAT 2: What were the sequelae?

WHEN: What were the dates and frequency?

WHERE: What body part was affected? (Left or right, upper arm/forearm etc).

WHY: Why was a procedure performed?

WHO: Who was involved? (Who carried out a procedure/made an assessment/is undertaking follow up, etc).

Once all necessary information has been received, CASA then submits full details of the case to a panel composed of aviation medicine practitioners. When appropriate, this panel may be supplemented by clinical or other specialists. A determination on the case will then be made and the applicant notified of the result.

If an applicant is dissatisfied with the panel’s determination, a review may be requested and/or the matter may be appealed to the Commonwealth Administrative Appeals Tribunal.

1.3.6 Identification of CASA Examiners (DAMEs, DAOs and DAEEs)

Each designated examiner (including approved locum examiners) requires an individual Aviation Reference Number (ARN), which must be obtained from CASA – refer Form1162.

CASA issues a unique identification stamp to each DAME. Each stamp carries a state or territory based code (‘A’ for ACT, ‘Q’ for Queensland etc, or ‘I’ for International) plus a three-digit number. Similarly, CASA issues a unique identification stamp to each DAO or DAEE. These also carry an alphanumeric code designating the state or territory plus a restriction limiting examinations to applicants’ eyes (‘SE’ for South Australia, ‘VE’ for Victoria, ‘IE’ for International, etc). Each stamp is intended for the exclusive use of the individual examiner to whom it is issued and, except as provided hereafter, must not be loaned to or used by any other practitioner without prior approval by the CASA PMO.

When CASA has approved a locum to act for a DAME, DAO or DAEE, the locum is to use the appropriate principal examiner’s stamp and also identify himself/herself as a locum in accordance with CASA procedures.
Locums

Locum approval must be obtained in writing from CASA prior to the dates requested. CASA requires a written request including the requested date, the contact details and signature of the proposed locum and the CV of the proposed locum. Once locum approval is gained in writing, the locum is able to perform aviation medical examinations and/or ophthalmological examinations using the existing stamp and writing 'locum' next to the stamp within the requested dates.

Locums are viewed the same as DAMEs and DAOs in terms of indemnification, rights and responsibilities. Locums are required to abide by the Conditions of Appointment.

CASA also issues DAME stamps to occupants of certain identified positions who otherwise meet the requirements for appointment as DAMEs (refer CASR 67). These are senior medical positions in the Australian Defence Force (ADF) or Royal Flying Doctor Service (RFDS). Whenever an approved ADF or RFDS medical officer performs a medical assessment under the auspices of one of these identification stamps, details of the individual examiner are also required. Thus it is only possible for ADF or RFDS medical staff who have registered with CASA to perform medical assessments under the auspices of one of these stamps.

The DAME/DAO/DAEE stamp plus the examiner’s ARN must be inserted on all applicant consent and examiner certification forms before their dispatch to CASA, together with signatures of the applicant and of the examiner.

Examiners’ identification stamps should be stored securely when not in use. The unique identification number on each stamp should be used in all correspondence between the examiner and CASA.
1.4.1 Electrocardiographs

Routine electrocardiographs are required at specified intervals for class 1 and class 3 medical certification. They may also be required on clinical grounds (see Section 2.2).

All ECGs sent to CASA are to be mounted on A4 paper and must contain the following information.

- Applicant’s full name
- Applicant’s ARN
- Date of recording.

Leads should be marked on the trace and the calibration mark should be clearly visible. The tracing should be performed using standard calibration (10 mm/mV). If half calibration is needed to clarify the standard trace, both should be sent to CASA. ECGs with slurred or incorrect calibration are not acceptable.

When self-reporting ECG machines are used, the reports are to be included with the tracings.

Where an ECG is known to be abnormal, copies of the previous ECG or reference to it (particularly regarding any changes) would be helpful and should speed CASA’s evaluation of the applicant.

Note that reports (whether by the DAME or other interpreter) should accompany all ECGs sent to CASA. Except for those already reported on by an approved specialist or interpreted by a self-reporting machine, CASA will arrange for a cardiologist to report on all ECGs. This process requires up to a week.

In future, CASA anticipates enabling on-line submission of ECGs via enhanced MRS Online. By then, CASA will likely require that all ECGs are reported on by a self-reporting machine, or interpreted and reported on by a cardiologist, physician or other specialist approved by CASA.

The DAME should also examine all ECGs and assess them as normal or abnormal, then provide details of any abnormality detected in the medical report.

Original issue ECGs performed for class 1 and class 3 applicants should be dispatched to CASA immediately following the examination. The DAME should read, assess and retain any future ECGs performed, except:

- At the first renewal after a class 1 or class 3 applicant’s 25th birthday and at designated intervals thereafter (refer to 1.4.7 ‘Special periodic Medical Examinations Required’), when copies are required for the applicant’s medical record maintained by CASA; and
- Any abnormal ECG must be sent to CASA, together with a cardiologist’s or other specialist’s report as appropriate.
1.4.2 Audiograms

The pure-tone audiogram performed by a DAME or any other person is treated by the Aviation Medicine Section as a screening test only, and is never used as the final arbiter of an applicant’s ability to meet the hearing requirements for a Medical Certificate. Audiograms performed by DAMEs are acceptable. However, any audiometer used for CASA-required audiograms must have been calibrated within two years of the date of such examinations.

The audiogram result is to be stated in the medical assessment form even when a printed results slip is included with the form when lodged.

DAMEs should enclose the audiogram result printout with the medical assessment forms for all original Class 1 and Class 3 applicants.

1.4.3 Special Hearing Tests

Where a supplementary speech test is required, this can only be performed by AHS as the calibrated tapes and other equipment required are not available elsewhere. If the applicant fails the speech-based hearing test, in some cases an in-flight test may be offered if he/she has a high level of aeronautical experience. Such an operational check will involve evaluation of relevant aspects of the applicant's hearing by a CASA Flying Operations Inspector or an Authorised Testing Officer with test material transmitted from a control tower. Ideally the test should be conducted in the class of aircraft that is the same as that which the applicant normally operates.

Further information is available from CASA Aviation Medicine Section.

1.4.4 Assessment by Designated Aviation Ophthalmologists or Designated Aviation Eye Examiners

An applicant for original class 1 or class 3 medical certification requires routine assessment and reporting by a DAO or DAEE.

A class 1 applicant who has attained the age of 60 years requires further routine assessment and reporting by a DAO or DAEE. Further assessments are required at intervals of every two years thereafter (refer Section 1.4.7 ‘Special periodic medical examinations required’).

Any applicant for original medical certification who fails to meet the required visual standard also requires assessment and reporting by an ophthalmologist or optometrist, usually a DAO or DAEE. CASA will determine subsequent requirements on a case-by-case basis.
Designated Aviation Medical Examiner's Handbook

1. Administrative Aspects

1.4 Special Investigations

Approved by Assistant Director, Aviation Safety Standards Version 3.0: December 2003

Where a DAME detects or suspects ophthalmic pathology in any applicant for medical certification, referral to a DAO for further assessment is required.

A small number of experienced class 3 medical certificate holders have been 'grandfathered' so as to retain their medical certification, despite being unable to meet the colour vision requirements of the class 3 standard.

1.4.5 Temporary Incapacity of Certificate Holders

Refer CASR 67.265 and CASR 67.270.

CASA requires medical certificate holders who experience any medically significant changes in medical condition to inform CASA or a DAME of such changes.

The information is required to be conveyed to CASA or a DAME after the applicant has been aware of the change:

- For a class 1 medical certificate holder, for longer than 7 days
- For a class 2 medical certificate holder, for longer than 30 days
- For a class 3 medical certificate holder, for longer than 30 days.

Thereafter, the DAME so informed is required to notify CASA of the matter within 5 working days. Refer CASR 67.125.

A licence holder must not perform any act authorised by the licence while he or she has a medically significant condition which impairs his or her ability to do the act. Before resuming the exercise of privileges under the licence, the licence holder must obtain prior confirmation of fitness from a DAME, as follows:

- For a class 1 licence holder, where the medically significant condition has been present for longer than 7 days
- For a class 2 licence holder, where the medically significant condition has been present for longer than 30 days
- For a class 3 licence holder, where the medically significant condition has been present for longer than 30 days.
A DAME usually need not perform a full medical examination in these circumstances, but should satisfy himself/herself that the applicant has recovered from the illness, injury or other medically significant condition and meets the required medical standard for exercise of the privileges of any licence held. Therefore, a DAME should not issue a medical certificate of the ‘X will be fit for duty from some later date’—type in anticipation of full recovery sufficient to meet the required medical standard.

Licence holders who fail to observe these requirements may be subject to heavy penalties, so DAMEs should take every opportunity to emphasise these legal requirements to them.

Certain trivial conditions in medical certificate holders need not be reported to CASA unless present at an applicant’s routine medical assessment. However, DAMEs are to advise applicants that these conditions must have resolved fully, without sequelae, prior to applicants resuming the exercise of privileges. Common examples include the following:

- Influenza, coryza, other URTI
- Cough in the absence of wheezing
- Sinusitis
- Occasional, mild headaches
- Uncomplicated urinary tract infection
- Gastroenteritis
- Uncomplicated haemorrhoid(s) if not bleeding and requiring only symptomatic treatment
- Mild allergic rhinitis, if no nasal blockage present and no antihistamine treatment required
- Minor soft tissue injuries without residual pain
- Muscular pain of short duration not requiring long-term medication and not related to any significant underlying chronic illness
- Dysmenorrhoea not requiring medication or absence from work
- Treated chronic fungal nail infections
- Dental extractions.

1.4.6 Additional Investigations and Specialist Opinions

The DAME should refer an applicant (or arrange referral through the applicant’s usual general practitioner) for appropriate specialist review(s) and/or other investigations whenever a significant abnormality in the history or physical examination of an applicant is detected. The purpose of such review or investigation is to clarify whether the applicant meets the required standard(s) for medical certification, or whether medical certification with appropriate conditions is compatible with the safety of air navigation.
Once the DAME has collated all relevant investigations and reports concerning the applicant, these should be sent to CASA, together with the DAME’s own assessment of whether the applicant meets the required standard(s) for medical certification, or whether medical certification with appropriate conditions is compatible with the safety of air navigation.

Where an applicant fails to return for follow up or completion of the assessment is delayed for more than one month for any reason, the DAME should forward to CASA advice of the situation and copies of any reports available. Thereafter, in the event of further delays, or of the applicant failing to return for review, the DAME should advise CASA as then appropriate. Written, faxed or e-mailed advice is required in these circumstances.

**Note:** MRS online will automatically capture incomplete medical examinations and highlight them for CASA’s attention 14 days after the examination has begun. CASA may then contact the DAME for an explanation of the circumstances surrounding the delayed completion of the assessment.
1.4.7 Special Periodic Examinations Required

<table>
<thead>
<tr>
<th>Certificate</th>
<th>Frequency</th>
<th>Requirements on Initial Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1 ATPL</td>
<td>12-monthly until age 60, then 6-monthly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
<tr>
<td>Class 1 CPL</td>
<td>12-monthly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
<tr>
<td>Class 2</td>
<td>Four-yearly until age 40, then two-yearly</td>
<td>FEV₁</td>
</tr>
<tr>
<td>Class 3</td>
<td>Two-yearly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
</tbody>
</table>

Examinations are as follows:

<table>
<thead>
<tr>
<th>Test</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio</td>
<td>Hearing test — audiogram</td>
</tr>
<tr>
<td>Eye</td>
<td>Specialist eye examination</td>
</tr>
<tr>
<td>ECG</td>
<td>Electrocardiogram</td>
</tr>
<tr>
<td>Serum Lipids</td>
<td>Total Cholesterol (fasting), HDL and LDL fractions</td>
</tr>
<tr>
<td>Blood Glucose</td>
<td>Blood Glucose (fasting)</td>
</tr>
<tr>
<td>Stress ECG</td>
<td>Exercise ECG on Bruce Protocol (no requirement for cardiologist referral)</td>
</tr>
<tr>
<td>FEV₁</td>
<td>Peak Flow (range is within 30% of the predicted value for height, sex and age – refer chart <em>Peak Expiratory Flow in Normal Subjects</em>)</td>
</tr>
</tbody>
</table>

Notes:

1. All ECGs performed in connection with medical examinations marked with an asterisk (*) in the ‘Age’ column in the Class 1 and 3 table below are to be forwarded to the Aviation Medicine Section.

2. All abnormal ECGs are to be forwarded to the Aviation Medicine Section with medical assessment forms.

3. Each applicant for a class 1 or class 3 medical certificate who scores 15 or more points on the American Heart Association Coronary Heart Disease Prediction Chart must undergo a stress ECG in accordance with the instructions at Section 2.2.6.
1. Administrative Aspects
1.4 Special Investigations

(Notes: Contd)

4 Each applicant for a class 1 or class 3 medical certificate should have his/her risk score calculated at the original medical examination, then at the first medical examination after age 25, thereafter every 5 years until age 60, thereafter annually.

5 Fasting serum lipid estimations must include total cholesterol, high and low density lipoprotein cholesterol fractions: be certain to specify this on the pathology request form as an ‘Occupational Requirement’. (This alerts the pathology laboratory that the investigation is not HIC rebatable and usually ensures it will be performed, even when other lipid values are within normal limits).

6 On occasions, applicants may have undergone certain of these tests or specialist reviews independently of the CASA requirement. CASA will accept certified true copies of recent results (only). Guidance on acceptable recency is contained in Section 1.8. Frequently Asked Questions.
### Classes 1 and 3 Additional Requirements

The table below gives the additional tests/examinations that are required at each renewal examination for applicants for **Class 1 and 3** Medical Certificates. Requirements for applicants aged more than 80 years will be advised individually.

<table>
<thead>
<tr>
<th>Age</th>
<th>Tests/Examinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>25*</td>
<td>Audio Serum Lipids and Blood Glucose ECG</td>
</tr>
<tr>
<td>30*</td>
<td>Audio Serum Lipids and Blood Glucose ECG</td>
</tr>
<tr>
<td>32</td>
<td>ECG</td>
</tr>
<tr>
<td>34</td>
<td>ECG</td>
</tr>
<tr>
<td>35</td>
<td>Audio Serum Lipids and Blood Glucose ECG</td>
</tr>
<tr>
<td>36*</td>
<td>ECG</td>
</tr>
<tr>
<td>38</td>
<td>ECG</td>
</tr>
<tr>
<td>40*</td>
<td>Audio Serum Lipids and Blood Glucose ECG</td>
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<tr>
<td>45*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
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<tr>
<td>50*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>55*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>60*</td>
<td>Audio Serum Lipids and Blood Glucose Eye</td>
</tr>
<tr>
<td>62*</td>
<td>Eye</td>
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<tr>
<td>64*</td>
<td>Eye</td>
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<tr>
<td>65*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
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<tr>
<td>66*</td>
<td>Eye</td>
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<tr>
<td>68*</td>
<td>Eye</td>
</tr>
<tr>
<td>70*</td>
<td>Audio Serum Lipids and Blood Glucose Eye</td>
</tr>
<tr>
<td>72*</td>
<td>Eye</td>
</tr>
<tr>
<td>74*</td>
<td>Eye</td>
</tr>
<tr>
<td>75*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>76*</td>
<td>Eye</td>
</tr>
<tr>
<td>78</td>
<td>Eye</td>
</tr>
<tr>
<td>80</td>
<td>Audio Serum Lipids and Blood Glucose Eye</td>
</tr>
<tr>
<td>&gt; 80</td>
<td>Requirements advised individually.</td>
</tr>
</tbody>
</table>
1.4.8 Other Special Examinations

Applicants for class 1 or class 2 medical certification who fail the Ishihara Pseudoisochromatic Plates (PIP) colour vision test are to be referred to a centre that conducts Farnsworth Lantern (FALANT) testing. Applicants for class 1 or class 2 medical certification who fail the Farnsworth Lantern tests are to be referred for practical signal light testing. Contact CASA Aviation Medical Section on 131 757 (toll free) or 02 6217 1641 (direct), for details of how to arrange this testing. Note that colour vision testing for these applicants is to follow the sequence PIP → FALANT → practical signal light testing. A pass on any of these tests will satisfy the requirements for issue of an unrestricted class 1 or class 2 medical certificate.

New applicants for class 3 medical certification are required to pass the Ishihara PIP colour vision test. No additional or alternative colour vision testing is available for this group. A small number of experienced class 3 medical certificate holders have been ‘grandfathered’ so as to retain their medical certification, despite being unable to meet the colour vision requirements of the class 3 standard.

For certain applicants, routine periodic urinalysis for drugs is a requirement of continued medical certification. It is medico legally essential that such testing be performed in accordance with a specified protocol. This protocol will be notified in due course.
1.5.1 General

Whenever appropriate, CASA places a condition or conditions of use on an applicant’s medical certificate(s) which influences the validity of the medical certificate(s). Multiple conditions may be placed on a medical certificate, and different conditions may be placed on different classes of medical certificate held by an individual.

1.5.2 Frequently Used Conditions Endorsed on Medical Certificates

<table>
<thead>
<tr>
<th>Endorsement</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renew by CASA only.</td>
<td>The DAME may not revalidate the medical certificate. Any revalidation or renewal is the prerogative of CASA Medical staff</td>
</tr>
<tr>
<td>Visual correction required.</td>
<td>Applicant requires visual correction in order to meet the visual standard. Appropriate correction must be worn when exercising the privileges of the licence. (Class 3 certificates only).</td>
</tr>
<tr>
<td>Assured Visual Correction Required</td>
<td>Applicant requires visual correction in order to meet the visual standard. Appropriate correction must be worn and a spare pair of prescription spectacles must be carried/readily available when exercising the privileges of the licence.</td>
</tr>
<tr>
<td>Near Vision Correction</td>
<td>Applicant requires visual correction in order to meet the near vision standard. Appropriate correction must be readily available and a spare pair of prescription spectacles carried/readily available when exercising the privileges of the licence.</td>
</tr>
<tr>
<td>Not valid for mustering or agricultural flying.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Valid in Australian Airspace only.</td>
<td>This endorsement indicates that the medical certificate is issued despite the holder’s failure to meet a required medical standard, as the safety of air navigation is not adversely affected. Use in any other ICAO contracting state requires specific advance approval by the Regulator for that state.</td>
</tr>
<tr>
<td>Valid in Australian airspace Only, valid up to and Including CPL</td>
<td>Self-explanatory</td>
</tr>
</tbody>
</table>
# Designated Aviation Medical Examiner’s Handbook

## 1. Administrative Aspects

### 1.5 Medical Certificate Endorsements

**Approved by Assistant Director, Aviation Safety Standards**  
Version 3.0: December 2003

<table>
<thead>
<tr>
<th>Endorsement</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not valid for ATPL operations.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Not valid for rotary wing operations.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Special conditions apply</td>
<td>Detailed, individually determined conditions are provided</td>
</tr>
<tr>
<td>Special conditions apply, Notified in accompanying letter dated dd/mm/yyyy</td>
<td>Detailed, individually determined conditions are set out in the referenced letter, which must be carried with the medical certificate whenever exercising the privileges of the licence</td>
</tr>
<tr>
<td>Holder to fly as or with a qualified co-pilot.</td>
<td>Refer 1.5.3 Multi-Crew Endorsement</td>
</tr>
<tr>
<td>Holder is required to inform employer of the nature and extent of his/her medical impairment and to co-operate in establishing mitigation strategies to minimise the effect of this impairment</td>
<td>Self-explanatory (Class 3 certificates only).</td>
</tr>
<tr>
<td>Holder may exercise the privileges of the licence without supervision, but there must at all times be another licensed air traffic controller who is aware of the holder’s impairment present and able to assume the holder’s air traffic management duties should the holder experience sudden incapacitation</td>
<td>Self-explanatory (Class 3 certificates only.)</td>
</tr>
</tbody>
</table>
1.5.3 Multi-Crew Endorsement

CASA uses multi-crew endorsements as a means of risk mitigation. Their use enables pilots to continue flying and air traffic control staff to continue duty despite the presence of medically-significant conditions which would otherwise pose an unacceptable risk to the safety of air navigation.

When a class 1 or class 2 medical certificate is endorsed with the condition ‘Holder to fly as or with a qualified co-pilot’, all of the following conditions apply:

1. The holder is restricted to operating either as or with a qualified co-pilot while exercising the privileges of the licence validated by the medical certificate. (Note that it is sometimes possible for an applicant to have an ‘as or with co-pilot’ restriction on a class 1 medical certificate but an unrestricted class 2 medical certificate).

2. Aircraft requirements:
   a. side-by-side seating in the cockpit
   b. fully functioning dual controls.

3. Certificate holder requirements:
   a. to wear shoulder restraint harness at all times
   b. to be prepared to relinquish command or control of the aircraft at the onset of any incapacity
   c. to ensure that the other pilot has read the requirements in this document.

4. Other pilot’s requirements:
   a. to occupy a control seat except for short absences in transport category aircraft in the cruise with the autopilot engaged
   b. to hold command endorsement for the aircraft
   c. to be current and appropriately rated for the flight
   d. to be aware of the type of incapacity the pilot may suffer in flight
   e. to be prepared to take command of the aircraft should the other pilot be unable to continue command.

**Note:** This condition does not:

a. Preclude the medical certificate holder from being left on the flight deck alone in a 2-pilot operation; or
b. limit the medical certificate holder from operating in a 2-pilot operation with another individual who has a medical certificate with this restriction; or

c. preclude the medical certificate holder from operating as a single pilot on a flight deck should the other pilot in a 2-pilot operation become incapacitated.
When a class 3 medical certificate is endorsed with the condition ‘Holder is required to inform employer of the nature and extent of his/her medical impairment and to co-operate in establishing mitigation strategies to minimise the effect of this impairment’, the following applies:

The holder who has such a restriction on a class 3 medical certificate is required to inform his/her employer of the nature and extent of his/her medical impairment and to co-operate with the employer in establishing strategies to minimise the risk of his/her impairment causing acute incapacitation. Relevant strategies may include, but are not limited to, measures such as special roster or shift arrangements, specified meal breaks, or guaranteed access to prescribed facilities.

When a class 3 medical certificate is endorsed with the condition ‘Holder may exercise the privileges of the licence without supervision, but there must at all times be another licensed air traffic controller who is aware of the holder’s impairment present and able to assume the holder’s air traffic management duties should the holder experience sudden incapacitation’, the following applies:

The holder who has such a restriction on a class 3 medical certificate is not permitted to undertake duty alone and is required to ensure, at the beginning of each shift, that his/her co-workers are aware of the type of incapacity the individual may experience while working and that at least one co-worker is available at all times to take over the individual’s air traffic management duties should such a sudden incapacitation eventuate.
1.6 Designated Aviation Medical Examiner Recommendations

1.6.1 General Matters

Procedures for dispatching routine medical assessment reports to CASA will be detailed in the *MRS Online Program Manual* currently under development.

Applicant statement and examiner certification forms should be forwarded to CASA as soon as possible following completion. On receipt, they will be scanned and attached to applicants’ medical files. (Note: CASA intends to develop more efficient alternatives to this procedure in subsequent versions of MRS Online).

ECG recordings, pathology and imaging reports and specialist consultation reports, as hard copies, should be forwarded to CASA as soon as possible following completion or when received by the examiner. Legible scanned copies of such documents may also be sent to CASA as attachments to medical assessment reports submitted online.

Lossy compression graphic formats such as JPEG should not be used because of the loss of information that accompanies the compression process. Do not attempt report scanning unless certain of the properties of the format used. CASA Aviation Medicine Section will provide further advice on request. (Note: CASA intends to develop subsequent versions of MRS Online that facilitate online lodgement of virtually all usually required documents).

Poor quality reproductions of such reports are of no use to CASA and DAMEs will be required to send replacements if MRS is unable to capture a legible image. This problem particularly arises with photocopied documents that are transmitted by facsimile.

Once a medical assessment report is received, the MRS Expert System will automatically determine whether or not the applicant clearly meets the medical standard(s) for the class(es) of medical certificate(s) sought. If the required medical standard is met, an automatic e-mail advice will immediately be dispatched to the originating DAME.

CASR 67 On receipt of such e-mail advice, a DAME may revalidate an applicant’s existing medical certificate for the appropriate period specified in the Regulations. Refer CASR 67.

CASR 67 If, for any reason, a DAME is unable to dispatch a routine medical assessment report immediately following its completion, but considers that an applicant meets the required standard for medical certification, the DAME may then revalidate the applicant’s existing medical certificate for the appropriate period specified in the Regulations. Refer CASR 67.
A DAME usually must not revalidate any medical certificate unless:

- e-mail advice from CASA confirms that the applicant meets the required medical standard; or
- he/she is unable immediately to dispatch a routine medical assessment report to CASA, but considers that the applicant meets the required medical standard; and
- the existing medical certificate does not bear the condition ‘Renew by CASA only’.

However, where the holder of a class 1 medical certificate which has been issued for 12 months is an ATPL aged over 40 who requires a medical assessment every 6 months to meet ICAO’s requirements (Refer to Section 2.15), a DAME may revalidate the existing medical certificate in the usual way for 2 months from the date of the examination, even though this period falls within the medical certificate’s continued validity for exercise of privileges in Australian airspace.

In this circumstance, the DAME should endorse the applicant’s medical certificate as follows:

‘Re-examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (this will usually be the date 2 months after the assessment date)

signature, date, DAME stamp

When a medical assessment report indicates that an applicant fails to meet the required standard for medical certification in any particular, the case will then be reviewed by CASA’s clerical assessors and/or medical staff and further advice provided to the applicant, DAME or other examiner as appropriate.
1.7.1 Aviation Reference Number (ARN) Identification

An applicant's Aviation Reference Number (ARN) must accompany all medical reports, ophthalmologists' reports, audiology reports and other specialists' reports and all correspondence concerning applicants sent to Aviation Medicine Section. All applicants should obtain an ARN prior to making an appointment with a DAME, DAO or DAEE for Original assessment. An ARN is required so the DAME or other examiner can connect to CASA's Medical Records System (MRS) to enter the applicant's medical details.

1.7.2 Aviation Reference Number (ARN) Registration

Application for an ARN can be made in person or by post. Application forms are available from the CASA website – refer Form 1162. Alternatively, visit one of the CASA Area Offices to apply in person.
A selection of frequently asked questions and answers to them is given below.

**Q.** When an applicant has had a required test or consultation independently some time before an equivalent CASA-required examination etc, under what circumstances will CASA accept such an examination in lieu of its own requirement?

**A.** The results of such external examinations are usually accepted only:
- where the result/report is credible in all the circumstances;
- where all parameters which CASA requires to be addressed in the report have been so addressed; and
- where the reported findings are sufficiently recent to be likely still valid at the time of the applicant’s assessment for medical certification.

**Note:** CASA will not usually accept ophthalmological or audiometry reports which have not been completed on its own (electronic) stationery, even when these tests were performed for another Regulator, because of slightly different requirements and potential difficulty with interpretation.

**Q.** When an applicant has had a required test or consultation independently some time before an equivalent CASA-required examination etc, and it appears otherwise acceptable per provisions of the preceding paragraph, for how long will CASA deem such an examination to remain valid in lieu of its own requirement?

**A.** The usual maximum validity periods for independent routine test reports which CASA will accept are:
- audiogram: 12 months
- ECG: 6 months (applicant < 40 years) 3 months (applicant +/- 40 years)
- fasting blood lipids/glucose estimations: 6 months
- ophthalmology reports: 6 months

If any results are abnormal or equivocal, repeat studies will be required.

**Q.** When an applicant has had a clinically-indicated test or consultation independently some time before an equivalent CASA-required examination etc, under what circumstances will CASA accept such an examination in lieu of its own requirement?

**A.** CASA will deal with each such case on its individual merits. DAMEs and other medical practitioners involved in an applicant’s case management are encouraged to contact medical staff at CASA’s Aviation Medicine Section to discuss individual requirements.
Q. What are CASA’s requirements for medical certification of NZ-qualified pilots who are granted equivalent Australian medical certificates under the terms of the Trans Tasman Mutual Recognition Act (TTMRA)?

A. The TTMRA and the reciprocal NZ legislation apply only to professional licence holders, so effectively concern only Class 1 licence holders. The legislation is completely silent on the issue of medical certification, so CASA and CAA NZ have agreed to deal identically, as follows, with affected pilots whose initial qualifications were gained in the other country but who now have a local licence.

The CAA NZ medical certificate used to validate the original (NZ) licence may be used to validate the newly issued Australian licence until expiry of the NZ medical certificate. (For a class 1 medical certificate, this may permit a validity period of up to 12 months). The relevant authority for this is CAR 5.04 (2).

The licence holder is required to carry the CAA NZ medical certificate when exercising the privileges of the newly issued Australian licence, and also to observe any conditions set out on that medical certificate or in an accompanying letter issued by CAA NZ.

On expiry of the CAA NZ medical certificate, the holder of the licence granted under TTMRA is required to undergo a full CASA ‘Original’ Class 1 medical assessment, including ophthalmology report, audiometry, fasting blood lipid and glucose estimations and resting ECG. As for other Class 1 applicants, a stress ECG should be arranged if indicated. Thereafter, these licence holders will be required to meet identical requirements to all other Class 1 medical certificate holders, including the usual suite of periodically required screening tests.

Q. For how long after blood donation should licence holders/applicants who donate blood refrain from exercising the privileges of an aviation licence?

A. CASA recommends that holders of all classes of medical certificates should usually refrain from exercising privileges of any aviation licence for at least 24 hours after a routine blood donation. In other or unusual circumstances, consultation with a DAME or contact with CASA Aviation Medicine Section is advisable before resuming exercise of privileges.
2.1 Overview

Visual cues provide the pilot's most important sensory input. Good visual acuity over all working distances is essential for safe operation of an aircraft. Information should be sought about the range of visual performance required of each pilot so that relevant advice may be given about suitable correction, if required, and about protection against glare.

If there is any doubt whether a pilot meets the required visual standard, referral to a CASA Designated Aviation Ophthalmologist (DAO) or Designated Aviation Eye Examiner (DAEE) for a detailed assessment and report is mandatory. A standard form has been developed for routine ophthalmological examination required for professional aircrew and ATCs (see also 6. Aviation Medicine Forms). Original examinations must be undertaken by a DAO or DAEE.

Visual Requirements Standard – CASR Part 67

The visual requirements standards are found in the following paragraphs of CASR Part 67:

**CASR 67.150**  For medical standard 1  
CASR 67.150  
Table 67.150  
1.31 – 1.39

**CASR 67.155**  For medical standard 2  
CASR 67.155  
Table 67.155  
2.31 – 2.39

**CASR 67.160**  For medical standard 3  
CASR 67.160  
Table 67.160  
3.29 – 3.37
2.1.2 General Visual Requirements

The Medical Standards in the Civil Aviation Safety Regulations (CASRs) stipulate that the functions of the eyes and their adnexae shall be normal. This requirement encompasses more than simply visual acuity. All Designated Aviation Medical Examiners (DAMEs) and Designated Aviation Ophthalmologists (DAOs) and Designated Aviation Eye Examiners (DAEEs) must satisfy themselves that this criterion has been fulfilled before assessing a pilot as meeting the required visual standard.

All applicants for initial issue of a Class 1 and/or 3 Certificate must be seen by a DAO or DAEE. All applicants for issue of a Class 1 and/or 3 Certificate must be seen by a DAO or DAEE at the time of first renewal of medical certificate after reaching the age of 60 years and at two-yearly intervals thereafter.

2.1.3 Refractive Error

Some degree of refractive error is found in the majority of eyes. Most of these errors are simple and are due to a slight lack of coordination of development of the various parts of the refractive system. They represent, therefore, a biological variation from the norm and should not be regarded as pathological.

Pathological refractive errors are relatively uncommon. They are due to gross developmental abnormality. The degree of error is usually high and the visual acuity is often not fully correctable while, particularly in myopia, the eye may show degenerative changes.

At birth, the majority of eyes are hypermetropic. From then until the age of eight years, this hypermetropia is seen to increase. After age eight, refraction becomes less hypermetropic (or more myopic) until approximately the age of 25 to 30 years, when relative stability is reached.
If, therefore, a young applicant has had less than the average degree of hypermetropia at birth, the natural shift to the more myopic side can result in the development of overt myopia, a development that is likely to progress until the age of 25 to 30 years, when some degree of stability is reached.

It is difficult to give an accurate prognosis of the progress of refractive errors since individuals do not necessarily conform to the population norm, and those who develop frank myopia frequently progress to the myopic side more rapidly than those who remain on the hypermetropic side of the population norm.

CASA has not placed restrictions on applicants who require high levels of correction in order to meet the required visual standards. CASA considers that ability to meet the standard is all that is required, regardless of the power of corrective lenses necessary to achieve this outcome.
2.1.4 Refractive Surgery

**Radial Keratotomy (RK)**

The role of radial keratotomy in reducing refractive errors is a significant current issue in aviation medicine. Persons who have undergone this procedure are often subject to diurnal fluctuation in visual acuity. If this is significant, (i.e. loss of more than one Snellen line for professional licence applicants and more than two Snellen lines for private licence applicants) **even if an applicant’s visual acuity is still within the pass standard**, this fluctuation constitutes failure to meet the visual requirements of the standard(s) concerned.

Applicants who undergo radial keratotomy before their myopia has stabilised are at risk of continuing progression of their myopia.

The long-term consequences of radial keratotomy are not yet well documented, so it is impossible to predict any long-term implications for pilot licensing. Applicants should be reminded of this uncertainty as it may affect their chances of employment in the aviation industry.

Following radial keratotomy, the refraction takes some time to stabilise to its new value. Flying is not permitted while the refraction is still plastic. Evidence of stability requires:

- A variation not exceeding 0.25 dioptres in refraction
- A visual acuity changing by not more than one Snellen line
- Visual acuity, which at least satisfies the minimum standard for the class of licence, at three paired serial measurements.

These three paired serial measurements are to be part of a full ophthalmological examination, are to include measurements early in the morning and late in the day, and must be delayed for at least three months following surgery. Note that some eyes may not have stabilised even as late as a year after surgery.

A second problem associated with radial keratotomy is sensitivity to glare. This can cause considerable difficulty in the healing phase but tends to settle with time. Testing of visual performance with a bright light shining at the applicant should demonstrate any continuing glare sensitivity.

All applicants whose eyes have stabilised following radial keratotomy must thereafter have an ophthalmological assessment every two years for Class 1 and 3 and every five years for Class 2 Medical Certificates.
2.1 Ophthalmology

Photo-ablative Refractive Keratectomy (PRK)

This is a new technique, using a laser, for changing refraction. The long-term implications are as yet unknown. The requirements for assessing stability after radial keratectomy outlined above should be followed after photo-ablative refractive keratectomy.

2.1.5 Monocular Pilots

Monocular pilots may be divided into two categories:

- The monocular condition—the situation in which an applicant has only one functioning eye.
- The functionally monocular condition—the situation in which an applicant has two eyes, but the visual acuity of one cannot be corrected to 6/9 or better.

Provided the visual acuity requirements can be met in the functioning eye, with or without correction, a waiver is granted for Class 2 certification, limited to Australian Airspace, for both the monocular condition and for functionally monocular pilots. Likely Conditions on an applicant’s Medical Certificate are:

- Not valid for mustering or agricultural flying.
- Valid in Australian airspace only.
- Special conditions apply.

Functionally monocular pilots who can meet the visual acuity standard with the remaining eye may obtain Class 1 certification. These applicants are required to show that flight safety is not jeopardised by the reduced visual acuity or absence of the other eye. Only the Aviation Medicine Section can issue this waiver. Likely Conditions on the resulting Medical Certificates are as set out above for Class 2 Medical Certificates.
2.1.6 Visual Acuity

**Distant Vision**

Record the uncorrected distant visual acuity in each eye separately, also binocular acuity. If the applicant wears correcting lenses, record the corrected acuity also for each eye and binocularly. For original examinations, check visual acuity without contact lenses and then with contact lenses. Acceptable values are as follows.

**Student and Private Pilots**

For students and private pilots, acceptable values are at least 6/12, corrected if necessary, in each eye. An acuity of at least 6/9 (with or without correction) with both eyes open is also required.

If the student or private pilot applicant cannot achieve 6/12 (with or without correction) in each eye, the DAME should inquire about the defective eye and record the cause.

In cases of doubt, referral to a CASA Designated Aviation Ophthalmologist or prescribing optician is indicated. These applicants may be acceptable for non-commercial licences; however, their licences will carry endorsements restricting operations to Australia.

By definition, if an applicant achieves no better than 6/12 in the poorer eye, the applicant is considered to be functionally monocular.

Applicants assessed as suitable for licensing with appropriate endorsements are required to have a stable visual condition to which they have adjusted. This provision affects pilots who have poor foveal static visual acuity but whose peripheral vision is normal (in practice, amblyopia). Those who have completely lost an eye or its vision may be assessed as fit after the Aviation Medicine Section’s consideration of such factors as the extent of visual field loss and the duration of the condition.

**Professional Flight Crew and ATCs**

For all professional flight crew and ATCs: 6/9, corrected if necessary, in each eye separately. Additionally, the acuity must be 6/6 or better when tested with both eyes open.

Applicants with high refractive corrections (i.e. greater than +/-5 dioptres) should be advised of the possible complications, which may affect their vision, and of the implications for their aviation careers, particularly their increased statistical chance of retinal detachment.

**Note** The equivalent spherical error is taken as the sum of sphere power plus half that of the cylinder, the calculation taking account of arithmetical signs.
The High Myope

CASA prescribes no limit and high myopes who meet the standard after correction are assessed as meeting the standard. The final decision in cases of high myopia depends on the applicant’s functional visual ability and on the absence of significant ocular pathology.

Although high-density lens material has enabled the lenses in corrective spectacles for applicants with high myopia to be thinner and so not cause unacceptable peripheral distortion, contact lenses are the preferred method of visual correction for myopes who require more than 5 dioptres of correction.

Near Vision

Near vision at all ages must meet the standards specified in the CAR Schedule (N5 with or without correction at 30-50cm and N14 at one metre without correction). DAMEs must check this function at every periodic medical examination for all applicants for aviation licensing.

Professional flight crew should be advised to have periodic ophthalmological examinations from age 45 to detect early signs of developing ocular pathology.

If an applicant cannot meet the standard, he or she should be referred for an ophthalmological assessment and appropriate spectacles prescription.

Near-vision spectacles have a limited range of clear vision, which depends on the power of the lenses prescribed and on the residual accommodation of the wearer.

It is vitally important that the range of clear vision encompasses all the near objects that need to be seen clearly. Typically this ranges from the reading of maps and operating manuals at ordinary reading distance to reading the more distant parts of the instrument display at a distance of one metre or more.

It is important that the spectacles prescribed are suited to the near working distances imposed on the pilot by the configuration of the flight deck of the aircraft. This becomes increasingly critical as an applicant’s presbyopia progresses with age.

The pilot should measure the working distances encountered in all seating positions on the flight deck, and record them prior to having a prescription for near vision determined. A suggested checklist for pilots is as follows.
2.1.7 Working Distances Checklist

<table>
<thead>
<tr>
<th>Object</th>
<th>Nearest (cm)</th>
<th>Farthest (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flight instruments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine instruments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Checklists</td>
<td></td>
<td></td>
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<tr>
<td>Electronic Flight Instrument Systems (EFIS) and flight management display</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach charts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio</td>
<td></td>
<td></td>
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<tr>
<td>General charts and manuals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Overhead Panels**

Overhead panels can cause difficulty because of their close proximity to the pilot’s eyes. This proximity ensures that the presbyopic pilot has difficulty seeing legends and numerals clearly, yet in order to view through the near segment of bifocals or through look-overs it is necessary to tilt the head back awkwardly. This may present particular difficulty in some aircraft types.

Possible solutions to difficulty in viewing overhead panels:

- The simplest solution is to lift the bifocals (or look-overs) so that the head does not have to be tilted so far back.

- Flip-down spectacles can be provided with an additional lens power to focus the overhead panel clearly when viewing through the upper distance part of the bifocal lens.

  However, flip-downs are cumbersome and there is a risk that they may be left down, causing blurring of distance vision. There is also a risk that they may flip down inadvertently as a result of turbulence during some critical phase of flight.

- There are vocational multifocals available which have a near segment in the upper part of the lenses as well as in the lower part. However, the distance portion between the two segments is only 12 or 15mm deep giving a distant vertical field of view of only 21 to 26 degrees. Pilots may find this impedes their visual scanning.

- A special multifocal lens can be constructed to provide a small near viewing segment in one corner of the upper part of the lens.
The more complex solution should usually only be pursued if pilots experience significant and persistent problems with the overhead panel. The overhead panel usually does not demand perfect visual acuity and is not often used in critical phases of flight, so it should not be assumed that it presents serious operational difficulties.
2.1.8 Bifocal Segment Height

The height can be set so that the pilot views the instrument panel through the near segment as well as using it for charts and manuals at an ordinary reading distance.

Alternatively the segment can be set low so that it is used only for charts, manuals and reading. When viewing the instrument panel the pilot will look over the top of the near segment to use the distance part of the bifocal.

This choice will depend on:

- Whether or not the pilot is having any difficulty reading instruments on the forward instrument panel; and
- The pilot’s residual accommodation. (At least 2.75 to 3.50D of accommodation is required to see the instrument panel clearly and comfortably through the distance part of the bifocals.)

If the segment is set low, the bifocals may not be suitable for everyday reading outside the aircraft. A separate pair of reading glasses of bifocals for everyday use may then be required.

**How to Determine the Correct Segment Height**

Optometrists and spectacle dispensers are skilled at setting the segment height correctly, but flying is a demanding occupation and it is worth taking pains to obtain an accurate prescription for the height of the near segment.

It is worth checking segment height on chosen frames or single lens distant vision glasses by stretching adhesive tape across the frame or lens whilst the pilot is seated in the cockpit. The position of the tape can be varied until its upper edge is at the height desired for the top of the near vision segment.
2.1.9 The Need for Trifocals

As presbyopia advances, the power of the near spectacle correction must be increased to compensate for further loss of accommodation power. As a result, the range of clear vision decreases.

For a pilot aged about 45 with 3.50D of residual accommodation, the power of the near addition typically prescribed is 1.00D. For this person, the range of clear vision is from two metres to 220mm, which should be more than adequate for all flight deck near-vision tasks. However, a pilot aged 50 to 55 with only 1.50D of residual accommodation is typically prescribed a near addition of 1.75D, giving a very much smaller range of clear vision from 800mm to 360mm. This range is suitable for near tasks at ordinary reading distances but does not permit clear vision of those parts of the instrument panel beyond 800mm.

When this occurs, trifocals are required. Trifocals provide an intermediate segment that has approximately half the power of the lower near segment.

2.1.10 Acceptable Forms of Correction

To comply with operational requirements, reading correction must be in the form of ‘look-overs’, bifocal or trifocal lenses as appropriate. Single vision lenses for near correction are not acceptable. See the diagram below.

![Diagram of Bifocal Lens, Look-over Lens, and Single Vision Lens]

- **Bifocal Lens**: For reading
- **Look-over Lens**: For reading
- **Single Vision Lens**: Whole lens for reading **NOT** suitable for flying

Approved by Assistant Director, Aviation Safety Standards
Version 3.0: December 2003
2.1.11 Progressive Power Lenses

These lenses provide a variable focus depending on which part of the lens is used for viewing. They provide a narrow intermediate visual channel and larger distant and near areas. These lenses may be associated with illusions of movement and distortion in the peripheral field of view. They should only be used for flying after adaptation in flight as a non-critical crewmember.

2.1.12 Contact Lenses

Provided the following criteria are met, contact lenses may be worn for correction of distance vision.

Both hard and soft contact acuity lenses are acceptable. The pilot must be able to wear the lenses throughout an ordinary day without experiencing any discomfort or deterioration of vision.

An acuity of 6/9 in each eye is required with correcting spectacles immediately after removal or displacement of contact lenses.

The pilot and the prescriber are responsible for ensuring that the pilot has adapted to the contact lenses sufficiently to perform his or her aviation duties. The duty period depends on the type of operations in which the pilot is engaged. The length of time that contact lenses can be worn without producing discomfort differs for private/pleasure flying and long haul commercial operations.

The choice of lens depends upon the nature of the correction required and on cabin conditions encountered.

Hard lenses tend to induce more discomfort and can be displaced by propeller wash or strong wind. Should a pilot need to remove the lenses in flight and substitute spectacles, post-wearing blur with decreased visual acuity should be anticipated.

Soft lenses do not cause those problems to the same extent. However, they may not fully correct astigmatism of greater than one dioptre.

For high myopes, soft contact lenses are preferable to spectacles. In the greatest degrees of myopia, the required visual acuity standards may not be able to be met using spectacles.

For initial issue examination, the contact lenses should be removed and the applicant’s visual acuity checked while wearing spectacles. The uncorrected vision should also be recorded. At renewal medical examinations it is not necessary for the applicant to remove the contact lenses unless the examiner considers this clinically indicated.
2.1.13 Sunglasses

Glare is often a cause of significant discomfort when flying above cloud or when flying into the sun. Sunglasses may be required in such circumstances.

There are two basic factors to consider when selecting sunglasses, namely the frame and the lenses.

Any spectacle frame reduces the field of vision. Narrow frames that carry large lenses are desirable. The most critical problem with frames arises from the presence of wide side-arms which significantly impair the peripheral visual field.

Sunglass lenses should protect the eyes from glare while not adversely affecting the visual cues necessary for safe flight. Accordingly, lenses should not be too dark, and should transmit at least 15% of incident light. The tint used should be "neutral density" (N.D.), that is, a greyish tint that does not distort colour perception or adversely affect red signal detection and recognition. The recommended tint is N.D.15.

Lenses of polycarbonate are preferred because of their impact-resistance and ability to absorb ultra-violet and infrared rays. However, these lenses can scratch readily and any scratched spectacles should be discarded.

To ensure that sunglasses provide adequate protection from solar radiation that may damage the eyes, only those sunglasses that conform to the current Australian Standard should be worn.

Sunglasses that conform to the current Australian Standard also meet acceptable standards for lens quality, frame strength and lens retention.

For aviation use, those sunglasses marked "Specific Purpose Sunglasses" are recommended, provided their frames are appropriate. The lenses of these sunglasses have been specifically designed for use in conditions of intense glare, such as in flight above cloud. At high altitude, atmospheric absorption of ultra-violet radiation is reduced.

Polarising sunglasses should not be used when flying. The polarising filter interacts with the cockpit transparency to produce a distorted and degraded visual field that poses a threat to air safety.

The pilot who already wears prescription spectacles for flying can choose from a number of options for glare protection. Prescription sunglasses with N.D.15 lenses can be obtained, or N.D.15 clip-on or flip-up sunglasses may be worn over prescription spectacles.

Pilots who require correction of their near vision only and who wear "look-overs" are advised to obtain bifocals and a plano upper segment. Clip-on or flip-up sunglasses can then be worn. However, the dangers of flip-ups previously mentioned should be recalled.
Graduated lens tint is another option. This provides glare protection for distant vision outside the aircraft, while near vision inside the aircraft is not impeded by the tint. It is usually considered that the use of a single tinted segment in bifocal glasses should be avoided as the visual effect of a "false horizon" may be disturbing and dangerous.

### 2.1.14 Photochromics

Spectacles can also be prescribed with photochromic lenses — lenses that change their density depending on the ambient light level. Under bright conditions they are like sunglasses, while in darker conditions they transmit light almost as well as untinted lenses. However, photochromic lenses have disadvantages that render them unsuitable for use by pilots.

Firstly, their transition times are relatively slow. Photochromic lenses take about five minutes to increase their density to the level of sunglasses, but more importantly, the bleaching time from maximum to minimum density can be as long as 30 minutes or more, although there is a rapid lightening of the lens in the first five minutes. This may be too long when there is a sudden variation in light during a descent into or under cloud, or because of a rapid change in cloud cover.

Their second disadvantage is that, even when fully bleached, photochromic lenses still absorb slightly more light than untinted lenses. Since vision is critically dependent on ambient light levels at night or otherwise when light levels are low, even this small decrease of light reaching the eye through photochromic lenses is undesirable. The inherent degradation of these lenses with time effectively prohibits their use in flying or controlling air traffic and applicants should not use them in these circumstances.
2.1.15 Colour Vision

Normal colour perception is becoming increasingly important as colour-coded cathode ray tube displays and colour coded visual approach lights become more prevalent. If any element of doubt exists about a pilot's ability to perceive colour normally, the case should be referred to the Aviation Medicine Section.

Commoner Types of Colour Vision Defects

<table>
<thead>
<tr>
<th>Type (Incidence)</th>
<th>Essential Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protanomaly (1.0%)</td>
<td>Colour matches are different from those made by normals (anomalous colour matching). Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Extreme protanomaly (0.2%)</td>
<td>Reduced colour discrimination for red, yellow and green. Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Protanopia (1.0%)</td>
<td>Confusion of red, yellow and green. Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Deuteranomaly (4.5%)</td>
<td>Colour matches different from those made by normals.</td>
</tr>
<tr>
<td>Extreme deuteranomaly (0.5%)</td>
<td>Reduced colour discrimination for red, yellow and green.</td>
</tr>
<tr>
<td>Deuteranopia (1.5%)</td>
<td>Confusion of red, yellow and green.</td>
</tr>
</tbody>
</table>

Test Procedure

The DAME is required to conduct a colour perception test, using the Ishihara 24-plate test. This test should be conducted even if the applicant is to be referred to an ophthalmologist. If the applicant should incorrectly identify more than two of the Ishihara plates, a test on a Farnsworth lantern is needed to determine whether or not he or she meets the colour perception standard.

The Ishihara plates test should detect all red/green colour vision defectives. Examiners should be aware, however, that some applicants may have learned the plates, and their presentation in random order is important. Other applicants have been trained to identify numbers on the plates by means of brightness cues or may even attempt to pass the plate tests by wearing an X-chrom or similar lens—a red contact lens worn in one eye which improves the colour defective's performance on the test.
**Plate Testing**

Reliable colour vision testing using the pseudoisochromatic plates requires that a standardised procedure be followed carefully. The main points are:

**Illumination**

Only the following are permitted:

- Daylight (but not direct sunlight). This is preferred.
- Fluorescent light from a fluorescent tube of 6,500 degree K colour temperature (normal daylight tubes).
- Phillips 'Bleu' incandescent lamp.
- Macbeth Colour Source C.
- Where an applicant is unable to pass the test when it is performed under artificial lighting conditions, it should be repeated in daylight before a failure is recorded. However, this additional test is not required where an applicant makes more than 12 errors or gives a history of known defective colour vision.

**Note** Before using fluorescent light, check the maker's label on the end of the tube to ensure the colour temperature is that specified. Tubes labelled "warm white" or "soft white" are not suitable.

- Where an applicant is unable to pass the test when it is performed under artificial lighting conditions, it should be repeated in daylight before a failure is recorded. However, this additional test is not required where an applicant makes more than 12 errors or gives a history of known defective colour vision.

**Position**

The applicant may stand or be seated, but should look squarely at the test plates from about 75cm distance. The applicant’s position should be adjusted so that no specular reflection from the glossy surface of the plates is observed. The applicant should not move his or her head while taking the test.

**Exposure Time**

Each plate is exposed for a maximum of five seconds.

**Procedure In Detail**

1. Check the applicant's position, illumination, watch or clock with second hand.

2. Open the book at the first (demonstration) plate.
3. Read out at conversational speed, pausing perceptibly where indicated.
   “I am going to show you some pages of dots. On some of them you can see a number, but some have no number. I want you to tell me if you can see a number and what it is. (Pause.)
   If you can't see a number, say "no number". You have up to five seconds for each page. (Pause)
   Is that clear?”

4. Now expose each test plate in random sequence.

5. When the applicant responds, or after five seconds have elapsed, whichever is sooner, turn to the next plate. Most applicants respond almost at once.

6. If more than one response is given to a plate, eg, "It's either three or eight", say "which one are you going to choose?" If the applicant changes his or her response, record the second response.

**Marking Standard**

Applicants scoring two errors or less on the 24-plate edition of the Ishihara plates meet the required standard. Those making three or more errors need to be tested on the Farnsworth Lantern.

**Note:** If the DAME suspects that a filter aid is being used, each of the applicant’s eyes is to be tested separately and then binocularly. The results are to be notified to the Aviation Medicine Section.

**Further Testing**

Some applicants with defective colour vision may be safe for aviation duties, e.g. mild deuteranomals. The Farnsworth Lantern passes these while failing all protanopes and deuteranopes and most protanomals and the more severe deuteranomals.

The Australian locations of Farnsworth Lanterns are listed in 5. Colour Vision Testing. Farnsworth Lanterns are not transported to outlying areas. Examiners should refer applicants who fail the plate test directly to the nominated centres for Lantern testing. Such referrals should be noted on the examination form. If there is no record of such referral on the form, the Aviation Medicine Section notifies applicants of their right to undergo further testing.

**Note:** Applicants for original class 3 medical certification must pass the Ishihara Plate Test.
An applicant who fails to meet the colour perception standard (i.e. who fails both the Ishihara Plate Test and the Farnsworth Lantern, but who meets all other standards) is eligible for issue of an operationally restricted student pilot, private pilot or commercial pilot licence. The holder of such a licence is given a dispensation to operate at night in a suitably radio-equipped aircraft. This dispensation applies to Australian airspace only.

Class 1 and class 2 applicants who are unable to pass either the Ishihara Plate Test or Farnsworth Lantern Test may be further assessed by means of Practical Signal Light Test. Details are available from Aviation Medicine Section.

2.1.16 Cataract

Applicants who have undergone cataract extraction(s) and who achieve acceptable visual acuity with lens implant and/or contact lenses may be passed at all licence levels following individual assessment by the Aviation Medicine Section. Full reports are required.

All other cases of cataract should be referred to an ophthalmologist. A report including assessment and prognosis is required. The final decision in these cases is based on the ophthalmology report.
2.1.17 Demyelinating Disease

Multiple Sclerosis (MS) is a central demyelinating disease involving multifocal demyelination of white matter, which initially affects young people under 40 years of age. The diagnosis requires multiple attacks of demyelination separated in time and locations. A thorough neurological history is important at the time of presentation. Nuclear magnetic resonance imaging (MRI) offers some help in diagnosis but should not be substituted for good history taking.

The most common ocular manifestation of MS is optic neuritis. It is the presenting feature in 25% of cases and occurs during the course of established disease in 70%. Between 50% and 70% of patients in the 20 - 40 year age group presenting with optic neuritis subsequently develop systemic demyelination.

Optic neuritis typically presents as sudden unilateral blurred vision progressing over a few days. The vision is often described as being "washed out"; colours appear desaturated and there is often associated retro/peri-ocular pain aggravated by eye movements.

Signs include reduced acuity of variable severity from minimal to "no perception of light"; an afferent pupillary defect (pupil dilates during the "swinging light" test); and dyschromatopsia (poor colour discrimination performance).

The most common visual field defect is a central scotoma. Ophthalmoscopy may reveal a swollen optic disc although the disc is often normal in the retrobulbar type of MS. Optic atrophy (associated with previous attacks) may be found in the ipsi- or contra-lateral eye.

Visual recovery is slower than the initial loss and usually takes between four to six weeks. About 90% of sufferers recover normal visual acuity. Minor defects in colour vision and brightness appreciation may persist. The effects of subsequent attacks are additive. There is no correlation between the degree of visual defect during the attack and the final visual outcome.

All pilots with optic neuritis should be referred to a Designated Aviation Ophthalmologist. Examinations should include visual field plots of both eyes. A typical case may require CT and MRI scanning to rule out compression of optic nerves or chiasma.

Sinister features in applicants with MS include failure of visual recovery after four weeks, persistent periorcular pain, proptosis, development of a quadrantic or hemianopic visual field defect, and field defect in the contralateral eye. All cases with severe visual acuity loss (<6/60) should be further investigated.

Flying duties in between infrequent attacks are possible provided there is adequate neurological and visual function monitoring. All cases should be referred to the Aviation Medicine Section for final assessment after adequate work up.
2.1.18 Glaucoma

All applicants for flight crew licensing who have glaucoma, or whom the DAME suspects may have glaucoma, must be assessed by a Designated Aviation Ophthalmologist. The DAME should not revalidate their Medical Certificates.

Primary Glaucoma

Closed Angle Glaucoma

Applicants should not be passed until the condition has been surgically corrected. Once corrected, a pass assessment may be issued after ophthalmological review.

Open Angle Glaucoma

Most open angle glaucoma is controlled by medication. The Aviation Medicine Section may issue a pass assessment only after receipt of a satisfactory ophthalmologist's report, which must include results of perimetry.

Preferred treatment is with beta-blocker drops. However, applicants with glaucoma controlled by other means are assessed individually.

Open angle glaucoma that has been successfully treated by microsurgical or laser techniques may be assessed as meeting the required standard by the Aviation Medicine Section.

Open angle glaucoma controlled with drugs requires annual ophthalmological review, including perimetry.

Secondary Glaucoma

Medical assessment depends on the underlying disease and the effectiveness of control. All cases should be referred to a Designated Aviation Ophthalmologist.
2.19 Macular Disease

The symptoms of macular disease include blurring and distortion of vision with micropsia or macropsia, which can be assessed with an Amsler grid. (This consists of a piece of paper showing a 10cm square divided into 5mm squares with a central fixation dot).

The subject is asked to fixate on the central dot, with each eye separately, at one third of a metre and to mark on the chart with a pencil, scotomata or areas of distortion.

When abnormalities are present, immediate referral to a Designated Aviation Ophthalmologist is required.

The commonest conditions affecting the macula are Central Serous Retinopathy and Disciform Macular Degeneration. All cases require final assessment by the Aviation Medicine Section.

Central Serous Retinopathy

The condition affects healthy young men with a hectic lifestyle. Only one eye is usually affected and reduction of acuity is mild (6/12 or 6/18). With a direct ophthalmoscope, dulling of the macular reflex is seen, representing a shallow central retinal detachment.

Vision recovers spontaneously within six weeks in 90% of cases. Stereoaucuity is temporarily lost and pilots should not fly until full recovery occurs. Laser treatment has been shown to speed the resolution of symptoms, but does not improve the final visual outcome, and no treatment is usually advised. The condition recurs in 20 to 30% of cases and the second eye is affected in 20%.

Macular Degeneration

This condition typically affects the elderly but inherited forms may affect younger people. Ophthalmoscopy may show small grey, yellow or white lesions, like small crystals, at the macula. These are called "drusen" (German, druse = nodule).

The visual acuity is usually well preserved, 6/9 or 6/12, until a further complication occurs — the development of a subretinal neovascular membrane that spreads under the macula and reduces vision to 6/60 or less.

To prevent the visual acuity from deteriorating below standard, regular follow-up is essential. In the early stages when the vision is distorted, but the acuity well preserved, the subretinal membrane can be obliterated by argon laser treatment.
2.1.20  Retinal Detachment

This may occur at any age although it is commoner in the elderly. Myopic people, particularly high myopes, are at increased risk. Advice on the long-term prospect of an aviation career should be given to those with high myopic refractive errors.

The most frequent type of retinal detachment follows collapse of the vitreous gel — Posterior Vitreous Detachment. The symptoms are a sudden shower of floaters (caused by vitreous haemorrhage or pigment release) and flashing lights, due to vitreous traction on the retina. Urgent referral to an ophthalmologist is mandatory to exclude the presence of a retinal tear.

At the stage when the retina is torn, but not yet detached, laser treatment may be used to seal the retinal tear before fluid from the vitreous cavity passes through it to detach the retina. Once the retina begins to detach, prompt surgery is necessary. If surgery can be undertaken before the retina detaches from the macula, the prognosis for maintained vision is excellent. Once the macula has been detached for more than a few hours, visual recovery is only partial.

A special form of retinal detachment, retinal dialysis, is the commonest type of detachment seen in young, otherwise healthy people who are not myopic. It may occur after a blunt injury, which causes a tear in the extreme periphery of the retina.

Intraocular gases are often injected into the vitreous cavity during retinal detachment surgery. The most commonly used gases are air, sulphur hexafluoride (SF6) and perfluoropropane (C3F8). Air takes only three or four days to be resorbed whereas the longest acting gas, C3F8, persists for up to six weeks. Air travel should be avoided until the gas bubble resorbs. Bearing in mind even in pressurised aircraft cabin altitude can be up to 8,000ft; a dangerous rise in intraocular pressure can occur if this precaution is overlooked.

In all cases of retinal detachment, once the condition is stabilised, a computerised visual field plot is mandatory before considering the applicant for return to pilot duties. The pilot should retain a copy of the plot for future comparison. The Aviation Medicine Section assesses each case individually.

2.1.21  Retinal Injuries

If a severe injury to the eye has occurred, with definite or suspected perforation of the globe, any aerial transport should be conducted at a cabin altitude of 4,000ft or less.
2.1.22 Strabismus

Whereas some degree of heterophoria is the norm, heterotropia (i.e. a manifest deviation of one eye from its normal position which occurs despite both eyes being open and uncovered), requires assessment by a Designated Aviation Ophthalmologist and final assessment, on an individual basis, by the Aviation Medicine Section. An applicant with an acuity (corrected or uncorrected) of worse than 6/12 is unacceptable, and a binocular acuity of worse than 6/9 is also unacceptable.

A majority of squint sufferers who have excellent cosmetic results from surgery and good visual acuity in each eye may still lack normal stereopsis (depth perception). They develop distance judgement by monocular cues and these are usually superior to those available to applicants who have lost an eye. However, their fine distance judgement for near distances is inferior to those with normal binocular vision. The Aviation Medicine Section individually assesses persons lacking binocular vision.

Squint may be latent or manifest. A latent squint is likely to become manifest under the influence of such factors as illness, fatigue, stress, drugs or alcohol. A cover test alternately on each eye unmasks latent squint.

The tests described below are designed to detect those who lack binocular vision.

**Cover Test**

Test at near (30cm) and at six metres. Use an accommodation fixation target at both distances. (For near an N5-size print and for distance a 6/12 letter). Ask subject to look at the fixation target, cover one eye and observe the other eye for refixation movement. Repeat test procedure for the other eye. Any refixation movement indicates possible squint.

**Lang Stereo Test**

Test at near (30cm). Hold card still and ask subject to name any pictures seen. Pass is three pictures: cat, star and car. A new Lang stereo test that tests to 200 degrees of arc is available. This may be considered superior to the standard Lang test that tests to 55 degrees of arc.

**Worth Four Dot Test**

Subject wears red/green goggles. Pass is identifying four lights, one red, two green and one white. Test at six metres only. Those who fail can undergo further tests, for example six-metre vectograph or Bagolini lens test to confirm if they truly lack binocular vision.
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Designated Aviation Medical Examiner's Handbook

2. Medical Aspects
2.2 Cardiology

Approved by Assistant Director, Aviation Safety Standards  Version 3.4: August 2008

2.2.1 Introduction

This section details the requirements for cardiological assessment of an aircrew member or air traffic controller and provides guidance on the aeromedical disposition of pilots and cardiovascular disease.

The aim of the examination is to ensure that the applicant does not suffer from any cardiovascular condition which carries an increased risk of incapacitation or which produces a decrement of physiological functional reserve that may jeopardise operational safety.

The DAME should recognise that an individual with an unrestricted Medical Certificate must be capable of performing all of the activities that are possible under the licence held.

These activities could include:

- Aerobatics, with the possibility of high G forces being encountered
- Operations in extremes of temperature for long periods
- Operations at altitudes where the partial pressure of atmospheric oxygen is decreased to two-thirds that which exists at sea level.

2.2.2 The Cardiovascular Standard – CASR Part 67

CASR 67 The cardiovascular standards are found in the following paragraphs of CASR Part 67:

CASR 67.150 For medical standard 1 CASR 67.150(7)
Table 67.150
1.9 – 1.11

CASR 67.155 For medical standard 2 CASR 67.155(7)
Table 67.155
2.9 – 2.11

CASR 67.160 For medical standard 3 CASR 67.160(7)
Table 67.160
3.9 – 3.11
2.2.3 Assessment

The DAME should note relevant risk factors for ischaemic heart disease in assessing an individual’s cardiovascular system. The risk factors to be considered are:

- Age
- Total cholesterol (fasting estimation)
- The total cholesterol to HDL cholesterol ratio (fasting estimation)
- Blood glucose (fasting estimation)
- Cigarette smoking
- Systolic blood pressure
- Hypertension
- Diabetes Mellitus
- Obesity
- Lack of regular exercise
- Positive family history of cardiovascular disease.

Obesity—while not a strong independent risk factor for ischaemic heart disease—when present, should be a trigger for more intensive evaluation of risk factors.

An applicant with multiple coronary artery disease risk factors should be considered for more detailed examination such as stress ECG.

**Mandatory Cardiovascular Risk Factor Profiling**

This is required for all Class 1 applicants in the years when fasting lipids are required.

Risk factor profiling is also required for all diabetic applicants of all classes of certificate at initial assessment after a diagnosis of diabetes has been made and at 5-yearly intervals subsequently.

A score should be calculated for the applicant with regard to age, lipid profile, systolic blood pressure, smoking, diabetes and LVH on ECG. At a score of 15 points, the 10-year probability of cardiac events approaches 1% per annum, which is the risk considered acceptable for professional aviators in a multi-crew environment. When the coronary risk score is 15 or above, applicants are required to have stress testing. It is a requirement for points-based stress tests, that the test is read and interpreted by a cardiologist. In situations where it is not feasible to have a cardiologist perform the stress test (eg, geographical access) then the test may be performed by a physician experienced in the performance of stress tests.

The requirements for mandatory 12-lead resting ECGs are detailed in section 1.4.1 Electrocardiographs in 1. Administrative Aspects.

### 2.2.4 General Principles

The following conditions are statistically associated with reduced functional capacity in cardiac reserve or with unpredictable risk of sudden incapacitation. Applicants with such conditions should therefore be assessed as medically unfit for certification. In individual cases, after thorough assessment, some may be granted Medical Certification.

- Uncontrolled systemic or pulmonary hypertension
- Any structural and/or physiological defect of the heart or circulation which results in regional circulatory ischaemia of a critical circulatory bed, or in ventricular hypertrophy or ventricular dilatation
- Any structural or physiological defect of the heart which results in electrical instability, either dysrhythmia or conduction defects
- A diagnosis of haemodynamically significant aortic stenosis
- Any structural or physiological defect of the heart or lungs which results in veno-arterial shunting and desaturation of arterial blood
- Any structural or physiological defect (and/or its consequences) that require the use of cardiotonic or vasoactive agents for compensation of cardiac reserve and for control.
2.2.5 Hypertension

Uncontrolled hypertension is disqualifying. A systolic pressure of 150 mm Hg and/or diastolic pressure of 90 mm Hg are the upper limits acceptable, but the applicant's age and sex should also be considered. If either or both the systolic and diastolic pressure repeatedly exceed(s) these limits, the applicant's blood pressure is not acceptable, even if on treatment. (These values accord with recommendations of the National Heart Foundation of Australia). Investigations by 24-hour ambulant blood pressure monitoring may assist diagnosis of borderline cases.

Controlled (adequately treated) hypertension is allowable at all levels of licence provided that there is:

- No significant end organ damage
- Satisfactory ECG
- No adverse drug side effects.

Acceptable Medication

Most modern antihypertensive agents are acceptable for control of hypertension in aircrew, provided the applicant is established on the medication and has exhibited no adverse side effects from the drug(s).

The applicant must not pilot any aircraft or actively control air traffic following the commencement of antihypertensive therapy or of a changed treatment regimen until such time as there are no significant side effects from medication and, in any event, not within one week of the commencement of therapy or change in medication. Preferred drugs include diuretics, ACE inhibitors, calcium channel blockers, prazosin angiotensin II antagonists and beta-blockers. Particular care should be taken with use of antihypertensive medications by aerobatic pilots, because of the reduction in G-tolerance produced by these agents.
2.2.6 Ischaemic Heart Disease

**Technical Specifications of Investigative Procedures Required in these Protocols**

**Stress Electrocardiogram**

1. Bruce protocol with a 12-lead ECG, with monitoring for at least five (5) minutes after cessation of exercise.

2. Applicant to reach at least 100% of predicted heart rate and at least nine minutes on the Bruce protocol or equivalent on the bicycle ergometer (maximum predicted heart rate = 220 beats per minute minus applicant’s age in years for men, 200 beats per minute minus applicant’s age in years for women).

3. Treadmill exercise is preferred but bicycle exercise is acceptable if the applicant is unable to perform on the treadmill.

4. Applicant should have been continuously in the time zone where testing is performed for at least 72 hours prior to the test.

5. Applicants should normally cease taking any beta-blocker 48 hours prior to the stress test, unless the medication is used to treat known ischaemic heart disease or a significant arrhythmia.

When a beta-blocker is not so ceased prior to stress testing an applicant, an explanation of the reason is required from the treating or investigating cardiologist who supervises the stress test.

6. All reports of stress tests should include the following details:
   - duration of exercise (with comment if less than nine minutes);
   - level of perceived exhaustion of the applicant; and
   - any symptoms experienced by the applicant.

7. A positive stress electrocardiogram is defined by 1.0 mm or more of horizontal or down sloping ST segment depression at 0.08 sec after the J point.

8. A positive stress ECG is of adequate diagnostic validity if recorded when an applicant’s exercise capacity, heart rate and blood pressure responses reach at least 85% of predicted for age, sex, height and weight, and where the ST segment shift is consistent with ischaemia.

**Note:** A rise of more than 20 mm in systolic blood pressure response is expected. If the applicant returns a positive stress ECG with ST changes before reaching 100% of designated criteria, it is a matter of even greater aeromedical concern. Exercise electrocardiograms are a screening test for the presence of Ischaemic Heart Disease (IHD) but do not provide conclusive evidence of the presence of IHD. Applicants need not refrain from exercising privileges simply because they are required to undertake a stress ECG.
9. If an applicant is unable to reach nine minutes or equivalent on stress ECG then a gated heart pool scan and cardiologist’s opinion may be acceptable alternatives. In these circumstances, the reason for ceasing the test must be stated.

10. In appropriate circumstances (eg severe arthritis), pharmacological stress testing may be substituted. This should be discussed with CASA Aviation Medicine Section before it is undertaken.

11. The physician supervising the investigation should report exercise ECGs. Computer reporting of exercise ECGs is not acceptable to CASA. In addition, CASA expects that when a stress test is required for clinical reasons, the cardiologist or physician responsible for the test will clinically evaluate that applicant.

12. Where an applicant has undergone recurrent false positive stress ECGs with ischaemia ruled out by means of a stress nucleotide scan, future stress ECGs may be accepted as normal provided there is no significant change to the ECG findings from year-to-year and the level of exercise in METS remains satisfactory.

**Stress Echocardiogram**

1. To be performed by an experienced laboratory, using standard recognised protocol, because of possible difficulty with interpretation.

2. Aim should be to achieve 100% of predicted heart rate, as for stress electrocardiogram, without developing any symptoms or signs of myocardial ischaemia.

3. For applicants undergoing pharmacological stress echocardiography using sympathomimetic stressors, atropine may be administered following the maximal dose of dobutamine.

4. A positive stress echocardiogram is defined by severe or extensive new wall motion abnormalities, horizontal or down sloping ST segment depression > 1mV at 0.08 seconds after the J point compared with baseline; new ST segment elevation >0.1mV in applicants without a previous myocardial infarction, or significant tachyarrhythmia. Applicants who have a positive stress Echocardiogram should not exercise privileges until their cardiac status is clarified.

5. If an applicant is unable to achieve 100% of predicted heart rate or if the test is terminated for other reasons, the reasons for ceasing the test must be stated.

6. ECG recordings should be carried out contemporaneously during the exercise test, and should be commented upon by the interpreting physician.
Stress Nucleotide (Thallium or Sestimibi) Scan


2. Bruce protocol stress to a minimum of 100% of predicted maximal heart rate and at least nine minutes exercise time.

3. Applicant should have been continuously in the time zone where testing is performed for at least 72 hours prior to the test.

4. Applicant should continue to take his/her usual medication(s) until tested.

5. Re-injection or 24 hour view if defects are present. This additional requirement may be omitted if the defect(s) is/are demonstrated to be non-reversible.

6. A satisfactory exercise nucleotide scan is recorded when the exercise or nucleotide scanning does not reveal defects consistent with myocardial ischaemia. Applicants who have a positive stress radio nucleotide scan should not exercise privileges until their cardiac status is confirmed.

7. ECG recordings should be carried out contemporaneously during the exercise test, and should be commented upon by the interpreting physician.

Coronary Angiogram

1. The angiogram is to demonstrate all major vessels, their tributaries, and grafts if present.

2. Left ventriculogram should be performed.

3. A significant stenosis is considered to be present if there is greater than 50% narrowing of any artery.

4. A satisfactory coronary angiogram is recorded when there is no significant stenosis seen in the native coronary circulation and/or where coronary artery bypass grafts appear without discernible wall pathology or have only minor irregularities.

5. The report should include a diagrammatic representation of the coronary arteries.

Gated Blood Pool Scan

1. Measurement of the ejection fraction gated heart pool scan may be required for uncertain cases where the ejection fraction is borderline or unreliable on stress nucleotide scan or stress echocardiogram.

2. The scan should show an ejection fraction greater than 45%.
Electron Beam Computed Tomography and ‘Calcium Scores’

1. Aviation Medicine is considering the potential use of this technology. However, in common with other regulators, it does not currently accept the results of these investigations as substitutes for any other required tests.

Cardiologist’s Assessment

This is to include recording of:

1. Clinical status.
2. Control of risk factors, including smoking and obesity.
3. Hyperlipidemia, hypertension, or diabetes mellitus.
4. A satisfactory gated heart pool scan, which should demonstrate no wall motion abnormalities associated with moderate hypokinesis.
5. An overall ejection fraction greater than 45%.
6. An acceptable fasting lipid profile, where total cholesterol is less than 5.5 mmol/L and the HDL fraction is greater than 1.0 mmol/L. Note that both HDL and LDL fractions should be recorded.

Cardiologist’s Review

This is to occur at six-monthly intervals and should include recording of:

1. Clinical status.
2. Control of risk factors, including smoking and obesity.
3. Hyperlipidemia, hypertension, or diabetes mellitus.
4. An acceptable fasting lipid profile, where total cholesterol is less than 5.5 mmol/L and the HDL fraction is greater than 1.0 mmol/L. Note that both HDL and LDL fractions should be recorded.

Issue of Aviation Medical Certificate Following Myocardial Infarction

Class 1, 2 or 3 Medical Certificates

Following the infarction, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months after the event.
Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment at six-monthly intervals
- Stress nucleotide scan (preferred) or stress echocardiogram.
- Ejection fraction estimation
- Coronary angiogram, unless this has already been undertaken.

If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction.

Subsequent Reviews

12 months post myocardial infarction:

- Routine aviation medical examination
- Cardiologist’s review every six months
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

At yearly intervals thereafter:

- Routine aviation medical examination
- Cardiologist’s review every six months
- Stress ECG at yearly intervals.

Issue of Aviation Medical Certificate Following Coronary Artery Bypass Graft (CABG).

Class 1, 2 or 3 Medical Certificates

Following the graft, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

This will not be considered until six months after the surgery for Class 1, 2 or 3.

Recertification

Investigations required for recertification are:

- Routine aviation medical assessment
- Cardiologist’s assessment
- Stress nucleotide scan
- Ejection fraction estimation.
If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction.

**Subsequent Reviews**

12-month intervals post coronary artery bypass graft:
- Routine aviation medical examination
- Cardiologist’s review every six months
- Stress ECG yearly.

**Note:** Angiography is no longer routinely required every five years, but may be required if an applicant develops new symptoms or other evidence suggesting worsening IHD despite treatment.

**Issue of Aviation Medical Certificate Following Coronary Artery Angioplasty**

**Class 1, 2 and 3 Medical Certificates**

Following angioplasty, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

This will not be considered until six months post angioplasty for all classes. While preliminary data suggested that drug-eluting stents may reduce the incidence of post angioplasty stenosis, more recent studies reveal that drug-eluting stents are associated with an increased risk of late thrombosis. As such, bare metal stents are preferable in the aviation context. CASA is not prepared to reduce the six-month post-treatment period at this time. CASA will continue to monitor this issue.

**Recertification**

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram
- Ejection fraction estimation.

If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction at all classes.
Subsequent Reviews

12-month intervals post angioplasty:
- Routine aviation medical examination
- Cardiologist’s review completed six-monthly
- Stress ECG.

**Note:** Angiography is no longer routinely required every five years, but may be required if an applicant becomes symptomatic or has other evidence suggesting worsening HID despite treatment.

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**Issue of Aviation Medical Certificate Following Evidence of Ischaemic Heart Disease**

**Class 1, 2 or 3 Medical Certificates**

When an applicant presents with:
- Ischaemic heart disease symptoms such as angina, arrhythmia; or
- Cardiac failure or other evidence of ischaemic heart disease, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

**Recertification**

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment conducted six-monthly
- Stress nucleotide scan (preferred) or stress echocardiogram
- Ejection fraction estimation.

If the stress nucleotide scan or stress echocardiogram is positive, the applicant must proceed to an angiogram.

If all investigations up to and including the stress nucleotide scan or stress echocardiogram are negative, the subject may be recertificated.

If the stress nucleotide scan or stress echocardiogram is positive but a subsequent angiogram is reported as satisfactory, the applicant may be recertificated.

**Subsequent Reviews**

This will depend on individual case assessment.
2.2.7 Valvular Heart Disease

Uncorrected Aortic Incompetence

**Class 1, 2 and 3 Medical Certificates**

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

**Recertification**

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist reports are satisfactory, the applicant may be recertificated for a period of one or two years depending on the severity of the condition and the rate of deterioration.

**Subsequent Reviews**

At annual or biennial intervals:

- Routine aviation medical examination
- Cardiologist’s review
- Echocardiogram
- ECG.

Corrected Aortic Incompetence

**Class 1, 2 and 3 Medical Certificates**

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA.
Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.

Where a tissue valve is used and there is no requirement for anticoagulation and certification may be unrestricted.

Where a mechanical valve is used, the applicant is to have evidence of clinically satisfactory, well-controlled anticoagulation and Class 1 medical certification will be restricted to multi-crew operations.

Subsequent Reviews

Classes 1, 2 and 3 require yearly review by a cardiologist.

Uncorrected Aortic Stenosis

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Electrocardiogram
- Doppler echocardiogram
- Chest X-ray.
If all of the investigations and the cardiologist’s report are satisfactory, the applicant may be recertificated solo for a period of 12 months, provided the following criteria are met:

- Aortic valve calcification grade 1 or 2
- Valvular Doppler jet velocity <3m/s
- Valve area >1.0cmsq
- Asymptomatic.

**Subsequent Reviews**

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and the cardiologist’s report are satisfactory, the applicant may be recertificated solo for a period of 12 months, provided the following criteria are met:

- Aortic valve calcification grade 1 or 2
- Valvular Doppler jet velocity <3m/s
- Valve area >1.0cmsq
- Asymptomatic.

**Corrected Aortic Stenosis**

**Class 1, 2 and 3 Medical Certificates**

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.
Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and the cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.

Where a tissue valve is used and there is no requirement for anticoagulation, medical certification may be unrestricted.

Where a mechanical valve is used, the applicant is to have evidence of clinically satisfactory well-controlled anticoagulation, and Class 1 medical certification will be restricted to multi-crew operations.

Subsequent Review

Class 1, 2 and 3 all require annual review by a cardiologist.

Aortic Root Dilatation

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA.

Yearly assessment by echocardiogram is required once the aortic root size reaches 3.8-4.0cm/m² due to the risk of rupture.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram.

If all of the investigations and the cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.
Subsequent Review

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram.

Uncorrected Mitral Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months without restriction.

Subsequent Reviews

At annual intervals thereafter:
- Routine aviation medical examination
- ECG
- Doppler echocardiogram
- Cardiologist’s review.
Corrected Mitral Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Doppler echocardiogram.

If the valve is replaced, a significant risk of embolism may remain, particularly if factors such as poor left ventricular ejection fraction, left atrial dilatation, atrial fibrillation and poor INR control are present.

Cases will be considered on an individual basis. Assessments will not be made until at least six months post surgery.

For valve repairs, if reports are favourable, applicants may initially be recertificated for 12 months.

Subsequent Reviews

Valve Replacements:

For Classes 1, 2 and 3, annual routine aviation medical examination. All applicants require cardiologist’s review with Doppler echocardiogram.

Valve Repairs:

All applicants require a routine annual aviation medical examination and cardiologist’s review with Doppler echocardiogram.
Uncorrected Mitral Stenosis

Class 1, 2 and 3 Medical Certificates

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram.

Applicants with mild uncorrected mitral stenosis (where the valve area is greater than 1.5 cm², the heart is in sinus rhythm, where there is no history of atrial fibrillation and the left atrial diameter is less than 4.5 cm), are permitted recertification for 12 months.

Other applicants will be considered on a case-by-case basis.

Subsequent Reviews

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- ECG.

Corrected Mitral Stenosis

Class 1, 2 and 3 Medical Certificates

Recertification

Investigations required for recertification following mitral valvotomy are:
- Routine aviation medical examination
- Cardiologist’s assessment, which is to include assessments of the incompetence and stenosis
- Doppler echocardiogram
- ECG.

If all of the investigations and cardiologist’s reports are satisfactory following mitral valvotomy, the applicant may be recertificated for a period of 12 months.
Following Mitral Valve Replacement

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA. This will not be considered until at least three months following mitral valvotomy or replacement.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Doppler echocardiogram
- ECG.

Following mitral valve replacement, applicants will be considered on a case-by-case basis on consideration of individual risk factors. Those with significant echocardiographic changes such as LA dilatation or atrial fibrillation may be subject to more stringent restrictions to their certificate.

Subsequent Reviews

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram.

Uncorrected Mitral Valve Prolapse

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram.

Applicants will be assessed on a case-by-case basis. Those with mitral valve prolapse with minimal or trivial mitral incompetence should require no more stringent follow up than clinically indicated. Those with more significant sequelae will be considered in accordance with their ongoing risk and rate of deterioration of their condition.
2.2.8 Bundle Branch Blocks

Partial or Complete Left Bundle Branch Block (Not Including Left Anterior Hemiblock)

Class 1, 2 & 3 Medical Certificates

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan
- Doppler echocardiogram
- Left ventricular gated blood scan to measure ejection fraction
- 24 hour Holter monitor recording.

If all of the investigations and cardiologist's reports are satisfactory, the applicant may be recertificated for 12 months.

Subsequent reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review.

Incomplete Right Bundle Branch Block

This is a common finding. There are no specific requirements.
Complete Right Bundle Branch Block

Class 1, 2 and 3 Medical Certificates

Note: This may be a normal variant in young applicants. A cardiologist’s opinion should however be obtained in these cases.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Echocardiogram
- Stress ECG if combined with LAHB as the combination is associated with ischaemic heart disease.

If all of the investigations and cardiologist's reports are satisfactory, the applicant may be recertificated for the maximum period permitted for the relevant medical certificate.

Left Anterior Hemiblocks

Class 1, 2 and 3 Medical Certificates

This is a common finding, however if this is a newly acquired condition, a stress ECG should be performed. If this is normal, there is no requirement for further reviews.

Atrio-Ventricular Blocks

First Degree

The only specific investigation required for those with first degree AV block is for a resting ECG, taken after exercise to ensure the block normalises with exercise. This may practicably be done in the DAME office.
Second Degree — Class 1, 2 and 3 Medical Certificates

Otherwise, on diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification
Investigations required for recertification are:

- Cardiologist’s assessment
- 24 hour Holter monitor recording
- Stress ECG.

If all of the investigations and cardiologist's reports are satisfactory, the applicant may be recertificated for 12 months. Applicants with untreated heartblocks of 2:1 or greater will not be recertificated for any class of medical certificate.

Subsequent Reviews
An annual ECG is required.

Third Degree Heart Block
Restricted certification may be available with the use of pacemakers.

Class 1, 2 and 3 Medical Certificates

Recertification
Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress ECG (to assess cardiac function)
- 24 hour Holter monitor recording.

Note: The pacemaker is to be dual chambered with bipolar leads, due to the unacceptable risk of electrical interference with pacemakers that have unipolar leads. The pacemaker is to have a technical check every 12 months, with the outcome reported to the Aviation Medicine Section.
Atrial Fibrillation and Atrial Flutter

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment, with particular reference to history and presence of any congenital abnormalities
- ECG
- 24 hour Holter monitor
- Doppler echocardiogram
- Stress test (to evaluate rate control at high workload)
- Biochemical profile, including: thyroid function studies, liver function studies, serum magnesium and potassium levels, fasting blood glucose (FBG).
- Haemoglobin estimation.

If drug treatment is required, there must be adequate rate control (as assessed by a cardiologist), without significant side effects. There should be no underlying structural heart disease. In these circumstances, all applicants may be recertificated for 12 months without restriction, unless prescribed warfarin. Where Warfarin is prescribed, CASA will require evidence of good INR control.

Subsequent Reviews

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review.

Bradycardias

Bradycardia should be taken in context. In a normally fit and healthy person or in an athletic individual there is nil concern. If the individual is generally unfit, has symptomatic bradycardia or if other ECG anomalies are associated with the bradycardia, then the applicant should be referred for cardiological assessment.
2. Medical Aspects
2.2 Cardiology

Ventricular Tachycardias

Ventricular tachycardias is most commonly picked up in the context of a stress test, in which case it may be normal. If VT arises in other contexts, the applicant should be referred for cardiological assessment.

Supraventricular Tachycardias

Most individuals with frequent episodes of supraventricular tachycardias will receive radiofrequency ablation, which, if successful, will be of no further concern. If controlled by medication, cardiological review should be sought with each medical examination. Applicants with SVT will be assessed on a case-by-case basis, however those with frequent episodes, and particularly those who experience significant symptoms with SVT may not be considered fit.

Wolff-Parkinson-White Syndrome

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Electrophysiological studies.

If WPWS is confirmed, the applicant is assessed as unfit until radiofrequency ablation of aberrant conduction pathways has been performed and the treating cardiologist has certified that conduction has been normalised.

Individuals who have demonstrated long refractory periods, where the WPW abnormality normalises on exercise may be considered for restricted certification on a case-by-case basis.
Subsequent Reviews

At six months, 12 months and 24 months post successful radiofrequency ablation of aberrant conduction pathways, the following are required:

- Routine aviation medical examination
- Cardiologist’s review.

If there is no recurrence of abnormal conduction within 24 months of successful radiofrequency ablation, further recertification without restriction should follow the normal pattern for the applicant’s age and class of medical certificate.

**Prolonged QT Syndrome**

Those applicants with long QT syndrome will generally be disqualified due to the risk of sudden death. Individuals will be assessed on a case-by-case basis, based on cardiological opinion.

**Brugada Syndrome**

Applicants with Brugada syndrome on ECG will require individual assessment by an electrophysiologist and cardiologist. Stratification is difficult; however there may be a subgroup with a relatively good prognosis. However, most individuals with Brugada syndrome will be assessed as unfit. Insertion of implantable defibrillator is not adequate risk mitigation in these individuals.

**Defibrillators**

Applicants requiring implantable defibrillators will be assessed as unfit. Studies show that 15% of shocks delivered are inappropriate. They are also potentially affected by EMF emissions. In addition, the risk of acute incapacity associated with a shock, regardless of the underlying pathology, is considered incompatible with aeromedical certification.

**Corrected Congenital Heart Anomalies**

In many cases, residual haemodynamic defects may preclude medical certification at any level for these applicants. Each case will be dealt with on its individual merits. A comprehensive cardiological work-up and report should be completed and full details forwarded to Aviation Medicine Section for assessment.
2. Medical Aspects
2.2 Cardiology

Other Cardiological Abnormalities

These can be extremely varied and range from trivial conditions to those which absolutely preclude medical certification at any level for these applicants. Each case will be dealt with on its individual merits. A comprehensive cardiological work-up and report should be completed and full details forwarded to Aviation Medicine Section for assessment.

2.2.9 Cardiomyopathies

Dilated Cardiomyopathy

Class 1, 2 and 3 Medical Certificates

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Two recordings of 24 hours Holter monitor studies
- Gated blood pool scan or echocardiogram assessment of cardiac output.

If ejection fraction is greater than 45% with no symptoms and a normal Holter monitor report, then a restricted certificate, on the basis of cardiological assessment of ongoing risk of arrhythmia etc, may be allowed. Individuals will be assessed on a case-by-case basis.

Subsequent Reviews

Class 1: Cardiologist’s review with gated blood pool scan or echocardiogram.
Hypertrophic Cardiomyopathy

Class 1, 2 and 3 Medical Certificates

Recertification
This condition is generally disqualifying. In all cases, further certification will be appropriately restricted.

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment, including detailed family history
- Stress ECG
- Doppler echocardiogram
- 24 hour Holter monitor recording.

If all of the investigations and the cardiologist’s report are satisfactory, and septal thickness is less than 1.5 cm, restricted recertification may be available.

Subsequent Reviews
Requirements will be individually determined and notified.

2.2.10 Cardiac Transplant

Applicants for Class 1 certification will be assessed as unfit.

Class 2 and 3

Recertification
Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Coronary angiogram (for detection of atherosclerosis)
- 24 hour Holter monitor recording
- Doppler echocardiogram.

If all of the investigations and the cardiologist’s report are satisfactory, Class 2 and Class 3 applicants may be recertificated on an individually determined basis.
Subsequent Reviews

At six-monthly intervals:
- Routine aviation medical examination
- Cardiologist’s review.

At annual intervals:
- Stress nucleotide scan
- Coronary angiogram (to assess coronary atherosclerosis)
- Doppler echocardiogram.
2.3.1 Introduction

This section details the assessment procedures for pilots, other aircrew members and air traffic controllers who suffer or who may suffer from lung or respiratory system disease.

The aim of the respiratory assessment within the aeromedical examination is to ensure that applicants do not suffer from lung or respiratory system disease which places them at an unacceptable risk of incapacitation, or which may otherwise jeopardise the safety of air navigation.

2.3.2 The Respiratory Standard – CASR Part 67

CASR 67.150 For medical standard 1
CASR 67.155 For medical standard 2
CASR 67.160 For medical standard 3

2.3.3 Assessment

All applicants for Australian aviation medical certificates are administered a comprehensive screening questionnaire physically examined by a DAME, and required to undertake a number of screening tests.

When conducting the respiratory component of the aeromedical examination, the DAME should note the presence of relevant risk factors for the development of lung and respiratory system disease and the presence of signs and symptoms suggestive or diagnostic of such conditions.

For example: risk factors for the development of asthma include:

- Family history of asthma
- Personal or family history of smoking
- Other allergies or atopic symptoms.
FEV₁ is measured at the original assessment and each renewal assessment. (Note spirometers should be calibrated to BTPS). Chest X Rays may be required if the applicant’s history or physical signs so indicate. This is likeliest in smokers or ex-smokers. Routine Chest X Ray is not required.

Further investigation of respiratory abnormalities may include flow loop spirometry, measurement of diffusion capacity, blood gas estimation (both at ground level and at simulated altitude) and various forms of imaging of the respiratory system.

Referral to a consultant respiratory physician may be required to confirm a diagnosis or to resolve concern over a differential diagnosis. CASA may also require an applicant for medical certification to be assessed by a consultant respiratory physician as part of its consideration of an applicant’s fitness for aeromedical certification.

### 2.3.4 Documentation of Respiratory Conditions

Many respiratory conditions are principally diagnosed and classified on the basis of history. DAMEs should take a careful and thorough clinical history before reaching a respiratory diagnosis, particularly a diagnosis that may significantly affect an applicant’s employment prospects. Particular attention must be paid to chronic use of any medications that are incompatible with the exercise of the privileges of licensure. Also see Section 2.13 Medication – Drugs and Flying/Controlling.

### 2.3.5 Asthma

**Diagnosis and assessment**

In the first instance care should be taken to ensure an accurate diagnosis of asthma, noting that the criteria of recurrent, reversible airways obstruction should be met. Subsequent assessment of asthma should distinguish between severity and control. Severity is in part determined by the amount of treatment required to maintain control (as evidenced by type and quantity of prescription or over-the-counter medications required to control asthma symptoms, the requirement for oral steroid medication and the number of Emergency Room presentations or hospital admissions due to asthma). CASA will not usually certificate applicants who suffer from severe asthma. Uncontrolled asthma, regardless of severity, is not acceptable in the aviation environment, and will preclude the issuing of any class of CASA medical certificate.

Applicants who have asthma which is well controlled (if necessary using anti-inflammatory therapy) may be eligible for any class of medical certificate. Applicants with mild well controlled asthma maybe required to undergo periodic spirometry. In the case of applicants with moderate well controlled asthma, periodic assessment by a respiratory physician may be required. CASA will notify specific requirements on a case-by-case basis.
Asthma severity

Severe asthma

Applicants with severe asthma experience continuous symptoms, limited physical capacity, and have a FEV₁ or peak flow measurement of less than or equal to 60% predicted. Peak flow variability may be greater than 30%. Treatment requirements of patients with severe asthma will likely include moderate or high doses of inhaled corticosteroid, with or without long-acting beta-agonist, oral theophylline, or inhaled anticholinergic. Some applicants may require oral corticosteroid. Patients with severe asthma may require care through hospital Emergency Rooms or even hospital admission when control of the condition is poor.

Moderate asthma

Applicants with moderate asthma generally have symptoms of airflow obstruction most of the time, and experience some impairment of physical capacity. Their FEV₁ or peak flow will be in the range 60-80% predicted, and peak flow variability may be greater than 15%. Treatment requirements will likely include low to moderate doses of inhaled corticosteroid, (e.g. beclomethasone 400-1000 micrograms per day or equivalent).

Mild asthma

Applicants with mild asthma generally have intermittent symptoms, interposed between symptom-free intervals that may be prolonged. FEV₁ and peak flows are often normal, and there may be no peak flow variability.

Asthma control

For CASA’s purposes, good control requires that, in the three months preceding assessment, the applicant:

- Has experienced no or minimal cough, wheeze or breathlessness on exercise or during the night
- Has maintained “best” pulmonary function
- Has maintained stable exercise capacity, although possibly somewhat impaired
- Has not required treatment with oral corticosteroid
- Has not required an Emergency Room visit/hospital admission for symptoms of asthma.
2.3.6 Chronic Bronchitis and Emphysema

Smokers aged 45 or more should undergo increased screening for these conditions for all classes of medical certificates. Positive findings dictate a full respiratory assessment, including a report by a respiratory physician. It is unlikely that applicants with severe chronic bronchitis or emphysema will meet the medical standard for issue of a class 1 medical certificate. However, restricted class 2 and 3 certification may be possible, on a case-by-case basis.

2.3.7 Pneumothorax

**Traumatic Pneumothorax.**

Medical certification for all classes is usually possible after review of medical reports covering precipitating factors, associated problems, extent of recovery and subsequent lung function. Full assessment by a respiratory physician may be required.

**Single Spontaneous Pneumothorax.**

An applicant who has had a spontaneous pneumothorax with full recovery and no obvious cause nor likelihood of recurrence may be assessed as fit for all classes of medical certification.

**Recurrent Spontaneous Pneumothorax.**

An applicant with recurrent spontaneous pneumothorax (defined as two or more episodes on the same side) is not usually acceptable for any class of medical certificate. If the pneumothorax has been surgically corrected by pleurodesis (mechanical or chemical) or pleurectomy, the applicant may be assessed as fit. Assessment by a respiratory physician may be required.

2.3.8 Pulmonary Tuberculosis

An applicant with active tuberculosis (but not open tuberculosis) may be medically certificated for any class provided there is adequate evidence that he/she is on appropriate therapy and there is no evidence of side effects from the therapy. Applicants with fully treated pulmonary tuberculosis should be aero medically assessed to determine the extent of lung damage/recovery. Assessment by a respiratory physician is required in all cases.
2.3.9 Sarcoidosis

Sarcoidosis is usually acceptable for all classes of medical certification, provided myocardial and other system sarcoidosis has been excluded. Reports of full cardiovascular and respiratory assessments are required.

2.3.10 Pulmonary Embolism

An applicant who develops pulmonary embolism must be comprehensively investigated to determine if there are significant underlying reasons for the episode. Once recovery is complete and the applicant demonstrates normal pulmonary function (including normal blood gases), unrestricted medical certification at any class is usually possible. CASA will not usually consider re-certification until at least 8 weeks after the episode. Pilots who are prescribed long-term anticoagulation with warfarin following a pulmonary embolism may be granted conditional certification.

2.3.11 Fibrosing Lung Diseases

Applicants with these conditions require full respiratory assessment, including blood gas estimation. Thereafter, certification may be possible on a case-by-case basis.

2.3.12 Obstructive Sleep Apnoea (OSA)

This condition is often under-reported because applicants fear loss of certification. DAMEs must specifically inquire whether or not the applicant has conditions that suggest OSA eg, loud habitual snoring, witnessed apnoea. Where the diagnosis is entertained, the Epworth Sleepiness Scale must be administered to the applicant. If the resulting score is 16 or more, assessment by a sleep physician is required. Following definitive diagnosis of OSA, unrestricted medical certification at all classes is usually possible after appropriate corrective treatment has been instituted and demonstrated to be successful. This usually requires reports from a sleep physician, before and after treatment.

Also see ‘Sleep Disorders’ in Section 2.6.17 (Psychiatry).

The Epworth Sleepiness Scale provides an estimate of the likelihood of dozing or falling asleep, in contrast to just feeling tired.

Applicants suspected of suffering from OSA should be questioned about their sleepiness during normal activities. (Even if the applicant has not recently undertaken some of these activities, they should be asked to estimate their relevant chance of dozing based on prior experiences).
Use this scale to allocate scores under 'chance of dozing' in each situation described.

- 0 = no chance of dozing
- 1 = slight chance of dozing
- 2 = moderate chance of dozing
- 3 = high chance of dozing

<table>
<thead>
<tr>
<th>Situation</th>
<th>Chance of dozing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting and reading</td>
<td></td>
</tr>
<tr>
<td>Watching television</td>
<td></td>
</tr>
<tr>
<td>Sitting inactive in a public place (e.g. a cinema or meeting)</td>
<td></td>
</tr>
<tr>
<td>As passenger in a car for &gt; 1 hour</td>
<td></td>
</tr>
<tr>
<td>Lying down to rest in the afternoon when circumstances permit</td>
<td></td>
</tr>
<tr>
<td>Sitting and talking to a companion</td>
<td></td>
</tr>
<tr>
<td>Sitting quietly after an alcohol-free lunch</td>
<td></td>
</tr>
<tr>
<td>In a car, while stopped briefly in heavy traffic</td>
<td></td>
</tr>
</tbody>
</table>

**Total Epworth Sleepiness Score**

If the score is 16 or more, assessment by a sleep physician is required.

(The Epworth Sleepiness Scale is reproduced with the permission of Dr M.W. Johns, A new method for measuring daytime sleepiness: the Epworth sleepiness scale. Sleep, 14(6):540-545.)
2.4.1 Introduction

This section details the assessment of pilots, other aircrew members and air traffic controllers who suffer or who may suffer from endocrine disease or from metabolic disorders.

The aim of the endocrine assessment within the aeromedical examination is to ensure that applicants do not suffer from endocrine or metabolic conditions which place them at an increased risk of incapacitation or which may produce a decrement in physiological or psychological function sufficient to jeopardise the safety of air navigation. In conducting the aeromedical examination, the DAME will recognise that an individual who holds an unrestricted medical certificate must be capable of performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities may include flight (either as a private or professional pilot):

- For prolonged duration, often as part of a shift roster
- Subject to disrupted sleep and time zone changes
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning

A number of these stressors may also affect Air Traffic Controllers.
2.4.2 The Endocrine Standard – CASR Part 67

CASR 67 The endocrine standards are found in the following paragraphs of CASR Part 67:

CASR 67.150 For medical standard 1 CASR 67.150(7) Table 67.150 1.16
CASR 67.155 For medical standard 2 CASR 67.155(7) Table 67.155 2.15
CASR 67.160 For medical standard 3 CASR 67.160(7) Table 67.160 3.15

For Medical Standard 1:

"A person suffering from diabetes mellitus may be assessed as meeting medical standard 1 if the condition is satisfactorily controlled without the use of any anti-diabetic drug."

For Medical Standard 2:

"A person who suffers from diabetes mellitus may be assessed as meeting medical standard 2 if:

a. The condition is satisfactorily controlled without the use of any anti-diabetic drug; or
b. If an oral anti-diabetic drug is used to control the condition:
   i. The condition is under on-going medical supervision and control; and
   ii. The oral drug is approved by CASA."

For Medical Standard 3:

"A person who suffers from diabetes mellitus may be assessed as meeting medical standard 3 if:

a. The condition is satisfactorily controlled without the use of any anti-diabetic drug; or
b. If an oral anti-diabetic drug is used to control the condition:
   i. The condition is under on-going medical supervision and control; and
   ii. The oral drug is approved by CASA."
2.4.3 Assessment of the Endocrine System

All applicants for Australian aviation medical certificates are required to complete a comprehensive screening questionnaire, to be physically examined by a DAME, and to undertake urinalysis for the presence of urinary glucose. In addition, applicants for Class 1 and Class 3 medical certificates are required to undergo fasting blood glucose estimation at the same time as they undergo five-yearly fasting lipid estimation. (CASA intends to introduce a requirement that applicants for Class 2 medical certificates will also be screened five yearly for diabetes mellitus by means of fasting blood glucose estimation).

When conducting an aeromedical examination, the DAME should note the presence of relevant risk factors for the development of endocrine or metabolic diseases and the presence of signs and symptoms suggestive or diagnostic of such conditions. Where such an endocrine condition is confirmed, evidence of secondary pathology or of accompanying complications should be sought and documented.

For example, risk factors for the development of diabetes mellitus include:

- Ethnic group
- Age >55 years
- Positive family history
- Obesity or significant overweight
- Abnormality of glucose tolerance
- Pregnancy
- Hypertension, dyslipidaemia, or clinical macrovascular disease
- Lack of regular exercise
- Use of diabetogenic medications.

Evidence of pathology secondary to diabetes mellitus may include vascular disease, retinal disease or renal disease.
2.4.4 Diabetes Mellitus and Impaired Glucose Tolerance

The incidence and prevalence of diabetes mellitus (of all types) has increased considerably in Australia in recent years. Up to 7.5% of the population now meets the diagnostic criteria for the condition (see Biochemical Investigations below). This is significant for aviation safety as diabetes mellitus is disqualifying for certification for aviation and air traffic control duties. The major aeromedical risk of diabetes relates to incapacitation (either overt or subtle), while it is also a major independent risk factor for a number of other incapacitating conditions—for example, stroke, acute myocardial infarction.

However, there is provision in the Civil Aviation Regulations for ‘a person who suffers from diabetes to be assessed as meeting the medical standard if the approved person conducting the relevant examination is satisfied that the diabetes is satisfactorily controlled without the use of an anti-diabetic drug’ or, for Class 2 and 3 medical certificate applicants, ‘where an oral anti-diabetic drug (approved by the Director of Aviation Medicine) is used to control the condition, the person provides evidence that he or she is undertaking on-going supervision and control of the condition’.

Classification of Diabetes Mellitus

Diabetes/diabetes precursor conditions are conventionally classified into four major types:

- Type 1 (absolute reduction in insulin production)
- Type 2 (resistance to the effects of insulin)
- Gestational
- Impaired glucose tolerance/impaired fasting glycaemia.

The majority of Type 1 diabetes mellitus sufferers use insulin regularly to manage the condition. Sufferers of Type 2 diabetes mellitus utilise a variety of management strategies: diet, oral hypoglycaemic agents and insulin, either singly or in combination.

Approximately one third of patients diagnosed with impaired glucose tolerance will subsequently have their glucose biochemistry return to normal, one third will continue to have impaired glucose tolerance and the remainder will eventually become sufferers of frank diabetes. Of aeromedical concern is the finding that all persons with impaired glucose tolerance have a statistically significant increase in their risk of developing ischaemic cardiovascular disease.
Biochemical Investigations

For medical certification purposes, any clinical suspicion of diabetes mellitus (such as urinalysis showing the presence of glycosuria) should be confirmed biochemically.

CASA recognises the following biochemical criteria, documented on at least two separate days, as confirming the diagnosis of diabetes mellitus:

- Fasting venous plasma glucose >6.9 mmol/l (less than 5.5 mmol/l—diabetes unlikely)
- Casual (random) venous plasma glucose >11.1 mmol/l (less than 5.5 mmol/l—diabetes unlikely).

Equivocal results of a fasting venous plasma glucose or casual venous plasma glucose estimation (between 5.5 and 6.9 mmol/l fasting or between 5.5 and 11.0 mmol/l casual) may indicate impaired glucose tolerance. In the event of an equivocal blood glucose result, DAMEs should order a 75 gram oral glucose tolerance test performed according to WHO 1999 guidelines and assessed according to the criteria in Table 2.4-1.

Table 2.4-1: WHO oral glucose tolerance test assessment criteria 1999

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Criteria—Venous plasma Glucose concentration (mmol/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes mellitus</td>
<td></td>
</tr>
<tr>
<td>• Fasting value</td>
<td>≥7.0 or</td>
</tr>
<tr>
<td>• 2 hr post glucose load</td>
<td>&gt;11.1</td>
</tr>
<tr>
<td>Impaired glucose tolerance</td>
<td></td>
</tr>
<tr>
<td>• Fasting value</td>
<td>&lt;7.0 and</td>
</tr>
<tr>
<td>• 2 hr post glucose load</td>
<td>7.8–11.0</td>
</tr>
<tr>
<td>Impaired fasting glucose</td>
<td></td>
</tr>
<tr>
<td>• Fasting value</td>
<td>6.1–6.9 and</td>
</tr>
<tr>
<td>• 2 hr post glucose load</td>
<td>&lt;7.8</td>
</tr>
<tr>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>• Fasting value</td>
<td>&lt;6.1 and</td>
</tr>
<tr>
<td>• 2 hr post glucose load</td>
<td>&lt;7.8</td>
</tr>
</tbody>
</table>
Other Investigations

All applicants for medical (re-)certification who have either diabetes mellitus or impaired glucose tolerance must also provide to the DAME the results of all glycosolated haemoglobin (HbA1c) estimations performed in the previous twelve months. A minimum of three estimations is required, with the most recent being performed no more than one month prior to DAME examination. (HbA1c results should be reported in % HbA1c and should indicate the laboratory reference range for the estimations.)

In addition, CASA requires the following information and test results from applicants with diabetes mellitus:

- A recent report (within three months) from an endocrinologist or specialist physician:
  - Current status of control of diabetes
  - Whether the applicant has any history of hypoglycaemia/hyperglycaemia in preceding 12 months.
  - If so, whether there was any requirement for external intervention or assistance.

- A copy of the applicant’s diary of ambulant blood glucose monitoring throughout the three months immediately prior to DAME examination. Desirable ranges are:
  - No readings below 2.8 mmol/litre
  - At least 90% of values between 5.5 mmol/litre and 10 mmol/litre.

- A copy of the applicant’s most recent annual ophthalmological assessment detailing:
  - Clinical status
  - Visual acuity (with and without correction)
  - Presence of retinal disease
  - Presence of other ophthalmic pathology.

- A copy of a recent cardiovascular assessment by a cardiologist or specialist physician, including results of resting ECG and interval Stress ECG. The report should detail:
  - Clinical status
  - Presence and control of risk factors—for example, hypertension, smoking, hyperlipidaemia (total cholesterol, LDL and HDL)
  - Assessed risk of any acutely disabling cardiovascular event.

- The result of recent renal function tests, including 24 hour urine protein excretion.

- Certification that the applicant has completed and understood a course of diabetic management education.

There are no specific requirements for applicants who have impaired glucose tolerance or impaired fasting glycaemia where these conditions have not progressed to frank diabetes mellitus. However, CASA advises DAMEs to counsel affected applicants on the potential aeromedical certification consequences of their progression to frank diabetes mellitus and to initiate or refer them for appropriate clinical management.
Medical Certification of Persons with Diabetes Mellitus

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

Requirements for medical (re-)certification are set out in the following paragraphs.

1. Persons with diabetes mellitus controlled by diet may receive medical certification at Class 1, 2 or 3 provided they meet the following criteria:
   - Evidence of stable blood glucose control:
     - Glycosolated Haemoglobin (HbA1c) taken within one month of assessment <7.5%.
     - Satisfactory reports as detailed under Other Investigations
   - Absence of complications that could result in sudden or subtle incapacitation when exercising the privileges of a licence.

2. Persons with diabetes mellitus controlled by diet and oral hypoglycaemic drug(s) may receive unlimited medical certification at Class 2 or 3 levels only. Such persons who seek Class 1 (re-)certification may be offered (re-)certification with an 'as or with co-pilot' restriction. Prior to their (re-)certification, CASA requires objective evidence that these applicants meet the following criteria:
   - No unacceptable side effects from drugs
   - Evidence of stable blood glucose control
     - No episode of symptomatic hypoglycaemia during the preceding 12 months
     - Glycosolated Haemoglobin (HbA1c), taken within preceding month <7.5%
     - Satisfactory reports as detailed in the previous section, Other Investigations
   - Absence of neurological, cardiovascular, ophthalmological, renal or other complications of diabetes mellitus that could result in sudden or unpredictable incapacitation when exercising the privileges of a licence.

3. Persons with diabetes mellitus who require insulin treatment do not meet the mandatory medical standards and are not fit for medical certification. However, in appropriate cases, the Director of Aviation Medicine may exercise discretion and issue a Class 2 medical certificate endorsed with the conditions 'as or with co-pilot only' and 'valid in Australian airspace only'. Prior to such certification, CASA requires:
   - Evidence of stable blood glucose control
     - No episode of symptomatic hypoglycaemia requiring intervention by others in the preceding 12 months
     - Serial Glycosolated Haemoglobin (HbA1c) estimations at two month intervals over the preceding 6 months—all results <7.5%
     - Satisfactory reports as detailed in the previous section, Other Investigations
Absence of neurological, cardiovascular, ophthalmological or renal complications of diabetes that could result in sudden or unpredictable incapacitation when exercising the privileges of a licence.

**Special Glucose Level Monitors**

Individuals with diabetes mellitus who receive aeromedical (re-)certification must possess and use a memory chip glucose meter for ambulatory blood glucose monitoring. The meter, together with a readily absorbable source of glucose, must be carried by the applicant while exercising the privileges of a licence. (When real-time ambulatory glucose monitoring becomes readily available in Australia, CASA may require this form of monitoring instead of monitoring with memory chip glucose meters.)

**Change in Treatment**

When an applicant’s oral hypoglycaemic medication is changed, or when its dosage is changed, he or she must not exercise the privileges of an aviation licence until the attending medical practitioner supervising the medication is satisfied that he or she is again stable and a DAME has recertified his or her fitness in accordance with CASA’s relevant medical standards.

**2.4.5 Thyroid Disorders**

The major aeromedical concern accompanying thyroid disease is the potential for abnormally high or low levels of thyroid hormone to affect an applicant’s cognitive function. Thyroid tumours have the potential to cause local symptoms or to metastasise to critical locations.

**Investigation**

Clinical suspicion of thyroid disease should be confirmed by appropriate investigations. These may include various imaging techniques, the use of fine needle biopsy, and biochemical thyroid function studies. CASA requires the results of thyroid function tests to establish that applicants are euthyroid prior to consideration for medical (re-)certification.
Medical Certification of Applicants Suffering from Thyroid Disorders

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. Requirements for medical (re-)certification are set out in the following paragraphs.

**Goitre**

Persons with goitre are acceptable for medical certification provided that there is no evidence of thyroid dysfunction nor of vascular or airways obstruction.

**Hypothyroidism**

Persons who are hypothyroid may be medically certificated provided Thyroid Function Tests (TFTs) demonstrate that adequate replacement therapy has been instituted and control maintained. TFTs should be performed annually for the first three years following initial diagnosis and periodically thereafter, as determined on a case-by-case basis, with serial results submitted with requests for medical re-certification.

**Hyperthyroidism**

Persons diagnosed as suffering from hyperthyroidism may be recertified once they are stable after surgery/isotope treatment/stable on medication and TFTs demonstrate that they are euthyroid. TFTs should be performed annually for the first three years after treatment is instigated and periodically thereafter, as determined on a case-by-case basis, with serial results submitted with requests for medical re-certification.

**Thyroid Cancers**

Thyroid cancer is disqualifying under Civil Aviation Regulations (1988). Persons diagnosed with thyroid cancer are obliged to refrain from performing licensed duties until they have been reviewed by CASA and a clearance to resume duties has been issued. While prognosis for cancer depends on many factors\(^1\), in most cases of thyroid cancer CASA will require documentation of successful removal of the tumour, completion of any subsequent radiotherapy, and the absence of metastatic disease before considering an applicant for (re-)certification. Under certain circumstances, conditional certification may be offered to pilots suffering metastatic disease.

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\(^1\) These factors include the type of cancer, the stage of disease when discovered, the aggressiveness of the individual cancer, cell type, the types of treatment available, co-existing diseases and the general health of the individual.
2.4 Endocrinology

2.4.6 Gout/Hyperuricemia

Gout and hyperuricaemia arouse aeromedical concerns because of the potentially incapacitating effect of acute symptomatic gout, and of the potential for high serum levels of uric acid to lead to symptomatic urolithiasis.

**Investigation**

Clinical suspicion of gout/hyperuricaemia should be confirmed by appropriate investigations, which may include estimations of serum uric acid levels and of urinary excretion rate. CASA will require the results of these investigations prior to considering an affected applicant for medical (re)certification. In the event that an applicant with gout suffers from abdominal pain, he/she should be investigated to exclude renal stone.

**Medical Certification of Applicants Suffering from Gout/Hyperuricaemia**

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

CASA will certificate applicants with gout/hyperuricaemia when the condition is satisfactorily controlled (either by diet or by allopurinol) and has been asymptomatic for at least one month. Applicants should not exercise the privileges of a licence when being treated with colchicine.

2.4.7 Hypothalamic and Pituitary Disorders

**Pituitary Adenoma**

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

Persons with pituitary adenoma will be assessed as unfit. Subsequent medical certification will depend on considerations of residual tumour, effects of raised intracranial pressure, any pressure effects on the optic chiasm, the effects of surgery or other treatment, the effects of any hormone excess or deficiency, and the effects of any drug therapy. In some instances, an applicant may be certificated with restrictions and appropriate surveillance following special medical assessment. Annual review, including reports from an endocrinologist or specialist physician and from an ophthalmologist, will be required.
2. Medical Aspects
2.4 Endocrinology

**Diabetes Insipidus**

On diagnosis, inform the CASA Aviation Medicine Section and advise the applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

This condition is marked by polyuria resulting from failure of vasopressin secretion. Fluid deprivation tests are diagnostic. Treatment is with vasopressin or one of its analogues. After the treated condition has been stable for a minimum of six months, applicants may be medically certificated with restrictions and appropriate surveillance. All such cases require special medical assessment, and CASA will determine aeromedical certification, when appropriate, on a case-by-case basis.

**2.4.8 Adrenocortical Disorders**

Disorders of adrenocortical metabolism have the potential to incapacitate or impair the ability of a pilot or ATC to perform duties. In addition, the underlying causes of adrenocortical disorders may themselves have significant aeromedical implications.

**Medical Certification of Persons Suffering from Adrenal Disorders**

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

- Aeromedical disposition will depend on cause and nature of adrenal disorder. Each applicant will be considered on a case-by-case basis and full documentation will be required. Applicants should be clinically stable and adequately treated clinically for a minimum of three months before being considered for certification.

- Cushing's Syndrome secondary to malignancy or ectopic ACTH secretion is disqualifying. Applicants with other causes may be certificated once the underlying disease has been effectively treated and hormonal status has returned to and been maintained within normal range for a minimum of three months.

- Applicants with Addison's disease may be certificated once their underlying disease has been effectively treated and their endocrine status has returned to and been maintained within normal range for a minimum of three months.
2.4.9 Parathyroid Disorders

Parathyroid disorders and associated disorders of calcium metabolism have the potential to impair a person’s ability to control an aircraft or to act as an Air Traffic Controller. Hyperparathyroidism leading to hypercalcaemia increases the risk of renal stone formation, peptic ulcer, mental changes and cardiac arrhythmia. (Hypercalcaemia due to malignancy should be excluded in such cases.) The less common hypoparathyroidism, if associated with hypocalcaemia, may cause disabling neuromuscular irritability and abdominal cramps.

Investigations

Prior to (re-)certification of an applicant with parathyroid disease, CASA requires a report from an endocrinologist or specialist physician and copies of pre- and post-management serum calcium and PTH levels\(^2\). If the applicant has suffered abdominal pain, CASA requires the results of imaging performed to exclude renal stones. Histology reports of specimens and the results of investigations to exclude underlying malignancy will assist in determination of the applicant’s fitness for medical (re-)certification.

Medical Certification of Persons Suffering from Parathyroid Disorders

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

- Applicants with hyperparathyroidism due to parathyroid adenoma may be (re-)certificated without condition(s) three months after surgical removal of the adenoma, provided that hormone and calcium levels have returned to and been maintained at normal levels. Hypercalcemia due to malignancy must be excluded. Full clinical details are required.

- Applicants with hypoparathyroidism may be (re-)certificated when estimation of hormone and calcium levels demonstrates that they have been stable on treatment (calcium and/or Vitamin D analogues) for at least three months.

\(^2\) Note that poor venepuncture technique may lead to spurious PTH and calcium results.
2.4.10 Hyperlipideamia

Hyperlipidaemias are an important risk factor for the development of coronary artery disease, stroke and heart failure, which are important potential causes of in-flight incapacitation. Control of lipid levels is an important mechanism for reducing the risk of in-flight incapacitation due to vascular mishap. Similar considerations apply in the case of ATC staff.

Investigation

Blood for lipid estimation (including total cholesterol, HDL, LDL and glucose) should be drawn after fasting—that is, after the applicant has had nothing to eat or drink except water for 12-14 hours. Abstinence from alcohol for several days prior to the test may lower triglycerides levels. Dietary changes in the few days before testing have little effect on lipid levels.

Medical Certification of Persons Affected by Hyperlipidaemia

- Persons with elevated cholesterol/triglyceride levels controlled by dietary means and/or nutritional supplements are not of medical concern to CASA.
- CASA is primarily concerned over the potential for lipid lowering drugs to cause side effects of aeromedical significance. CASA will certificate pilots (both Class 1 and 2) or ATCs taking any of the lipid lowering drugs currently available on prescription in Australia, provided the applicant tolerates the medication well and experiences no significant adverse side effects. A minimum of one month of ground testing is required before the applicant returns to flying/controlling duties.
- Lipid estimation is part of CASA’s cardiovascular risk management program. Should a Class 1 or Class 3 medical certificate holder be found to have an annual risk of cardiovascular event greater than 1% (currently a score of 15 or more points on CASA’s cardiovascular risk assessment tool), he/she will be required to undergo a stress ECG per CASA protocol.
2.4.11 Obesity

Obesity, defined for CASA’s purposes as a BMI >35, is of medical concern because:
- It is an independent risk factor for the development of vascular disease
- The physical dimensions of the obese person may reduce a pilot’s ability to manipulate an aircraft’s controls safely, or to escape in the event of an accident or incident.

Investigation

Applicants who have a BMI >35 must be assessed by a DAME, who is to seek evidence of other pathology secondary to the obesity. Obese pilots will be required to demonstrate their ability to control an aircraft safely and to escape in the event of an emergency as part of their certification assessment. This may involve undertaking a CASA directed operational flight/ground check.

Medical Certification of Obese Applicants

Obesity per se is only of concern to CASA from an air safety perspective if an applicant suffers from another aeromedically significant disease or condition secondary to the obesity or his/her physical dimensions affect the safe exercise of the privileges of a licence. Such applicants will be assessed on a case-by-case basis. Obese applicants who are otherwise well and can exercise the privileges of a licence safely will be certificated without restriction.

2.4.12 Anorexia

Adult applicants with a BMI <18.5 may suffer from an eating disorder. Prior to certification, a DAME should assess them to exclude such disorders. See section 2.6 Psychiatry.

2.4.13 Appetite Suppressants

CASA will not authorise pilots to fly or ATCs to perform ATC duties when taking any appetite suppressant medication.
2.5 Neurology

2.5.1 Introduction

This section on neurological disorders outlines some of the major categories of neurological diseases that are commonly encountered and indicates their aviation medical significance.

2.5.2 Nervous System Standard – CASR Part 67

The nervous system standards are found in the following paragraphs of CASR Part 67:

- **CASR 67.150** For medical standard 1
  - CASR 67.150
  - Table 67.150
  - 1.7 – 1.8

- **CASR 67.155** For medical standard 2
  - CASR 67.155
  - Table 67.155
  - 2.7 – 2.8

- **CASR 67.160** For medical standard 3
  - CASR 67.160
  - Table 67.160
  - 3.7 – 3.8
2.5.3 Headache

Nearly all applicants have experienced headache. The diagnosis of primary headaches are not discrete and the different types should be considered to be part of a continuous spectrum ranging from Muscular Tension Headache at one end to Classical Migraine at the other. Secondary headaches from other conditions eg, Cranial Neuralgia, Temporal Arteritis should be considered separately.

When considering primary headaches it is important to assess the history according to:

- **Speed of onset**: Is there warning eg, aura or no warning?
- **Period of prodrome**: seconds, minutes or hours?
- **Frequency**: isolated or recurrent, if recurrent how often. Time off work is a useful guide.
- **Neurological symptoms**: aura (crippling or just perceived), photophobia, visual changes, paraesthesia, paralysis, dysphasia etc.
- **Severity**: need for acute and intensive intervention such as parenteral opiate analgesics, degree of incapacitation such as need for bed rest vs ability to continue complex tasks.
- **Treatments and their effectiveness**: How effective prophylaxis if used. Type of acute treatment used eg, Tryptins and speed of response and any significant side effects.
- **Precipitating factors**: such as diet, oral contraceptive etc and effect of avoidance or withdrawal of such factors.

Since objective investigations will most usually negative, a detailed history is essential. The best history is obtained at first presentation.

*Migraine*

For strict diagnostic purposes, migraine is an acute but reversible transient cerebral vascular insufficiency phenomenon and headache is not necessary the most important component. When the vascular insufficiency effect predominates it should be distinguished from transient ischaemic attacks. In the worst case migrainous stroke can occur where the implication for flight duties is similar to that for stroke.

Beware of Atypical Migraine without headaches.

In common usage, the term migraine may refer to any headache, but there are two main types — common migraine and classical migraine.
Common Migraine (Migraine without Aura)

More than 80% of migraine sufferers experience "common" or "non-classical" migraine, which is not associated with sharply defined neurological disturbances.

It is often a label used for Tension Headache perceived to be of significant severity by the patient. Careful history will avoid the diagnosis of migraine with its implication vs. Tension Headaches.

Diagnosis of "nonclassical" migraine depends on:

- Detailed history of headaches
- Usually an absence of significant neurological symptoms.

Treatment usually does not include parenteral opiates or specific migraine drugs such as vascular active agents.

Classical Migraine

Classical migraine is accompanied by any transient focal neurological and/or vascular phenomena that may include:

- Unilateral headache
- Hemiparesthesia, Hemiplegia
- Retinal/Occipital phenomena, such as visual disturbance of various degree and scotomata
- Basilar artery phenomena
- Autonomic symptoms of nausea, vomiting etc.

Such migraines have variable periods of remission and rate of onset, and may completely incapacitate the sufferer. There is no universal exclusion of medication. Significant side effect should be explored and their presence or absence documented.

Adverse factors for aeromedical certification include:

- Sudden significant neurological symptom such as loss of vision, weakness and incoordination with no warning
- Failure or of prophylactic treatment with frequent attacks
- Requirement for intensive treatment
- Short prodrome that does not allow effective use of acute treatment before symptom onset.

The Aviation Medicine Section considers all cases individually.

Australian Government
Civil Aviation Safety Authority

2.5-3
Cluster Headache

Cluster headache is a subgroup of vascular headaches where the frequency of occurrence has a characteristic “cluster” nature. Aeromedical certification assessment considerations are similar to those for migraine. The details of history required are the same.

Other Types of Headache

Tension (Muscle Contraction) Headache

This category of headache can assume the nature of a vascular headache with a pulsating quality when it is severe and is often confused with migraine.

It includes headaches occurring secondary to other conditions that gave rise to muscular tension, e.g. eyestrain, cervical pathologies, psychiatric conditions in which management of the underlying cause is of prime importance.

Chronic tension headaches that require treatment such as anxiolytics or other drugs likely to cause a decreased state of alertness or diminished performance require specialised assessment.

Cranial Nerve Headache

The commonest of these conditions is trigeminal neuralgia. This may be idiopathic or secondary to underlying disease. Irritation of the nerve may be relieved by surgical intervention, which requires specialised neurosurgical assessment. Consideration must be given to the risk and implication for certification associated with any neurosurgery. The side effects of medications commonly used in its treatment include diminished judgement and diminished depth perception. Relevant history should be elicited and documented.

The Aviation Medicine Section assesses all cases individually.

Local Cranial Disease

Temporal arteritis

This condition need not be disqualifying if controlled, particularly when steroid therapy has been ceased. Full specialist reports are required for assessment.

Adverse factors associated with it include loss of vision and intracerebral involvement with significant functional sequelae.

The Aviation Medicine Section assesses all cases individually.
2.5.4 Blackouts, Loss of Consciousness and Syncope

These words are often used interchangeably by both laymen and medical professionals. A detailed description is more informative than the label. It does not necessary describe loss of consciousness (LOC) but can be used to mean an altered state of consciousness, vertigo or even psychiatric disturbance such as fugue-like states. Causes can be primarily neurological, secondary to cardiovascular pathology, gastrointestinal upset, physiological or even be specific to aviation causes such as G induced loss of consciousness.

History of the event is paramount in differentiation of the causes. The applicant should be directed to relive the experience in his/her own words, without prompting. Only when that is established should more direct questions about the circumstances before, during and after the event be asked. The patient’s account of sensations should be elicited. Observer history should be obtained if available. If uncertainty exists, record the uncertainty rather than introduce attempts at explanation. Such factual records allow further independent evaluation where necessary. The value and accuracy of the history deteriorates with time and repetition of recounting.

Specific features that will help in differentiating the physiological system involved are:

- **Prodrome**: absence or present.
- **Posture at the time of the episode**.
- **Period**: ie, duration of attack.
- **Postictal orientation**.
- **Activity before, immediately and within 24 hr preceding**.
- **Head trauma**.
- **Frequency**.
- **Urinary incontinence**.
- **Tongue biting**.
- **Observer report**: confirmation of patient’s account, particularly concerning convulsive movements. Time course to any convulsive movement is important ie, did it occur at the same time as LOC, or seconds later?
- **Bystanders’ action**: eg, promptly placing patient in prone or coma position, or keeping patient sitting/upright.
- **Family and/or past history**.
- **Known cardiovascular history or risks**.
- **History of infection such as recent viral infection that may support labyrinthitis**.
Depending on the historical features elicited, the need for referral to relevant specialist/s can be determined. If the cause is primarily neurological, refer to neurologist or neurosurgeon for clarification. For possible cardiovascular causes, cardiologist opinion should be sought. Where the history suggests vestibular problem, ENT opinion will be appropriate.

The Aviation Medicine Section assesses all cases individually.

**Concussion**

The term should be restricted to brief LOC in the setting of blunt head injury with no demonstrable intracranial injury. The emphasis is on the brief duration, which should be in the order of 5 minutes or less. If the event accords with these criteria and no sequelae are reported, it is generally of no significance for aeromedical certification. An exception is made for repeated concussions such as occur in boxers.

**Transient Global Amnesia (TGA)**

The cause of TGA is uncertain. It may be first warning of TIA. Current theory considers it to be a transient, migraine-type of vascular phenomenon. The condition should be distinguished from epilepsy, particularly complex partial epilepsy and symptomatic intracranial tumours.

Relapse can occur and may be precipitated by exercise, coitus, or exposure to water. A period of observation is necessary to monitor relapses. Risk of relapse is 30% and can recur once or twice. Where frequent attacks are present, other diagnoses should be considered.

The condition is benign and affected applicants can be aeromedically certificated following a suitable period of observation. Neurological reports are required in all cases and follow up reviews may be necessary.
2.5.5 Disorders of Equilibrium

**Benign Positional Vertigo**

This is a true rotational sensation accompanied by nystagmus, occurring only on change of head position. It is usually idiopathic or secondary to head trauma. Its course is variable. Assessment is based on the frequency of occurrences, their duration and severity.

**Acute Peripheral Vestibulopathy (Vestibular Neuronitis and Acute Labyrinthitis)**

Diagnosis implies temporary unfitness to fly. If the condition settles without recurrence, a return to unrestricted flying may be permitted after three months.

**Menière's Disease and Acute Recurrent Positional Vestibulopathy (ARPV)**

In these conditions, vertigo usually lasts for hours and often causes chronic disequilibrium. Menière's disease and ARPV have high recurrence rates. Applicants with these conditions are usually unable to meet the standard for certification, but require individual assessment.

**Alternobaric Vertigo**

In this condition, vertigo occurs on change of air pressure, often after a forceful Valsava manoeuvre to clear the ears. Oscillopsia and nystagmus may accompany it.

Occasionally this condition is due to chronic eustachian tube compression (e.g. by hypertrophied adenoids) and may thus be surgically correctable. Recurrent cases are assessed individually.

**Momentary Vertigo**

This is generally considered to be benign unless there is evidence that it significantly affects the applicant.

**Non-Functioning/Hypo-Functioning Labyrinths**

This condition is characterised by unsteadiness of gait, by loss of orientation (particularly in the dark) and by inability to maintain accurate visual fixation while in motion. It is often secondary to aminoglycoside administration. The degree of functional impairment should be fully investigated for decision by the Aviation Medicine Section.
Vestibular Imbalance

Applicants with this condition may experience feelings of unsteadiness on rapid change of position. It is generally benign and a “pass” assessment may be issued.

Multisensory Dizziness

This is a chronic condition of loss of balance or feeling of light-headedness in persons with multiple sensory disorders, such as a combination of two or more of:

- Peripheral neuropathy
- Vestibular imbalance
- Visual impairment
- Cervical spondylosis, and
- Hearing loss.

Multi-sensory dizziness is assessed according to the degree of disability present.

Note: Drugs used to control dizziness and vertigo often produce drowsiness. Control of these symptoms by drugs with such side effects is not acceptable for pilot or ATC medical certification. See also Section 2.13 Medication – Drugs and Flying/Controlling
2.5.6 Seizure Disorders

**General**

The tendency towards epileptic seizures is not an “all or nothing” phenomenon. Most people, under certain conditions, may have a seizure if sleep deprived or withdrawing from alcohol or benzodiazepines, especially if in addition they are taking medications that decrease the seizure threshold (e.g. tricyclic antidepressants). Approximately 2% of the population have a seizure during their lifetimes.

Following a single seizure, an adult has a 30-40% chance of recurrence. Those with a distinct epileptiform abnormality on the EEG, in the setting of a history of seizure, as opposed to non-specific abnormalities, have an increased risk of further seizures.

**Diagnosis**

It is imperative that there be an accurate diagnosis of the type of seizure. The importance of a description of the event cannot be overemphasised. While a useful diagnostic tool, any EEG must be reviewed by an experienced reader and must be evaluated in the context of the clinical history. It is not a useful sole diagnostic or screening tool.

The important components to the diagnosis are:

- More than one event, except Post Traumatic Epilepsy (PTE) for which one event will establish the diagnosis
- Must be unprovoked.

Video-EEG confirms the diagnosis but is not easily available as it is time consuming and difficult to organise except in academic research facilities.

**Aeromedical certification considerations**

A detailed history and specialist neurologist opinion is essential. Provoking factors must be considered. Their absence suggests a poor prognosis.

Significant adverse factors are:

- Unavoidable concomitants of aviation eg, strobe lights, propeller flicker, fatigue
- Difficult to avoid eg, menstruation.

Provoking factors that are avoidable or insignificant in context of aviation are:

- Alcohol excess and/or withdrawal
- Sleep.
These should be considered with regards to risk of occurrence in the absence of such factors.

Individuals with established epilepsy, ie, more than one unprovoked attacks, are unfit for aviation medical certification. Persons who have experienced seizures but who are not diagnosed as epileptic may be deemed to meet the medical standard.

**Partial (Simple or Complex) Seizures without progression to Generalise Seizures**

The term Partial Seizure often misleads patients to consider the condition is not as significant as the classical Grand Mal Seizure. Careful counselling of patients should include the explanation that such terms are anatomical and electro-physiological distinctions. The functional effect of impaired conscious state and/or brain activity is equally as significant as in other epilepsy.

**Sleep (Nocturnal) Epilepsy**

Epilepsy that occurs only when asleep is distinguished from sleep disorders such as Sleep Behaviour Disorder, Sleep Apnoea etc. Such disorders must be excluded. Sleep EEG recordings—best with video recording (if possible), will confirm the diagnosis.

The condition is associated with increased risk of seizure when awake ie, progression to the more “classical” type of epilepsy. This risk is increased when the condition is untreated.

Since aircrew and air traffic controllers are not performing flight-related duties when asleep, sleep as a provoking factor is not relevant in the aviation context. When the condition responds to anticonvulsants, the risk of such a seizure during flight related duties is further reduced.

Prior to certification, the effect of anticonvulsant control failure or “breakthrough” must be considered. Expert neurological opinion should be sought to determine if such a control failure occurs. The first presentation may be recurrence of sleep epilepsy or epileptic seizure whilst awake. Recurrence that first presents as fits whilst awake poses a flight safety hazard.

Aviation Medicine Section assesses all cases individually.

Important indicators of less risk are:

- No further occurrence of sleep epilepsy
- Absence of significant side effects of anticonvulsant.
Childhood Seizures

Childhood febrile seizures that are brief, not associated with neurological deficits and have ceased before the age of five are not generally disqualifying. The applicant must have been off all anti-epileptic medications for at least five years and the off-medication EEG, should be normal.

The seizures of Benign Rolandic Epilepsy of Childhood usually involve the face, tongue or hand and are often precipitated by drowsiness or sleep. The EEG shows significant abnormalities from the Rolandic area. Individuals with this condition may be considered for certification if they have been seizure free and off medication for ten years. They must have a normal neurological examination and EEG. A sleep deprived EEG should also be obtained and must be normal prior to issue of any aviation medical certificate.

Petit Mal or Juvenile Myoclonic Epilepsy is seizure disorders that occur in childhood. Because such conditions may persist into or present during adulthood, they are considered as subtypes of epilepsy. These conditions are associated with a risk of progression to generalised convulsions.

The Single Epileptiform Seizure

Extreme care must be taken to diagnose epileptic seizure in the presence of a single event. Clonic movements from transient brain hypoxia or from other causes are often reported as seizures. The condition should be considered as Loss of Consciousness (see above section on Blackouts, Loss of Consciousness and Syncope). Non-epileptic causes should be sought and excluded.

An individual with a single epileptiform seizure is initially unfit for medical certification. A case may be reconsidered five years from a seizure if the following conditions are met:

- Specialist neurological examination is normal
- Repeated EEGs, including sleep-deprived EEGs, do not reveal any significant abnormalities
- Studies incorporating additional nasopharyngeal or minisphenoidal electrodes, if relevant, do not reveal any significant abnormalities
- Neuro imaging, preferably by MRI, has demonstrated normal brain structure.

For continued medical certification five years after initial certification or recertification, all of the above investigations must be repeated and reported as normal. Applicants for Class 1 certification may be restricted to "as or with co-pilot" for a further two years. Individuals who have a second seizure are considered to have epilepsy.
When a single seizure was related to alcohol withdrawal, applicants may be considered for medical certification earlier if they have a normal EEG and Neuro imaging, and psychosocial and biochemical evidence is presented that their alcohol abuse is in a continuing "recovery" phase. The alcohol abuse should be dealt with as a separate medical problem.

Those who have had a seizure while on tricyclic antidepressant drugs or other seizure enhancing medications should be considered more prone to seizures than the average population. Both neurological and psychiatric opinions should be sought to manage their interrelated problems. Psychiatric report should indicate the optimum treatment required and if alternative treatment is suitable and/or available. The neurological report should indicate the applicant’s risk of further seizures, particularly if using other psychotropic medication for psychiatric treatment.
2.5.7 Head Injuries

There are two major concerns over fitness for aviation-related duties following head trauma. One is the neuropsychological consequence of the trauma in applicants who have not had any clear focal deficits and the other is the possibility of Post Traumatic Epilepsy (PTE).

The neuropsychological consequences are secondary to the effects of acceleration/deceleration forces on the skull and brain. Because of the anatomy involved, these forces cause their greatest focal damage to the orbital, frontal and anterior temporal areas of the brain. Diffuse white matter damage may be associated with the cortical damage.

The result of such injury is dysfunction in a number of functional executive activities of the brain. Frequent effects include:

- Slowing of reaction time, impaired memory and decreased ability to maintain a high level of performance over time, particularly in settings of complex activities and choices,
- A high propensity for further mental decline with fatigue, and
- Other problems include maintaining attention, initiation and proper sequencing of tasks, difficulty in planning and anticipating, and difficulty in establishing automatic responses to a trigger.

The affected individual may not notice or care that the task is being poorly performed. Stress, fatigue and pain may exacerbate all these effects, and the handling of simultaneous emergency tasks is particularly affected.

Although the effects of head trauma may be severe, routine IQ and mental status testing may be within normal limits. Fortunately there is a natural tendency for neurological deficits to improve with the passage of time. There are a number of ways to predict the outcome of a head injury. The most commonly used is the duration of post-traumatic amnesia (PTA). Serial sequential neuropsychological tests separated by months or years can document changes associated with improvement of neurological deficit. A pre-trauma baseline test of such nature will provide the ideal reference but is not usually available.

The limitations of neuropsychological testing should be recognised eg, learning; subjective interpretations by the tester, interface issues (particularly if computer-based) and its results should be interpreted with these limitations in mind.
Mild Brain Injury

This is characterised by:

- Transient loss or alteration of consciousness without any focal neurological deficit and with rapid return to alertness and orientation
- Post-traumatic amnesia (PTA), which occurs when a person is conscious but ongoing events are not recorded in the memory. The duration of this lapse must be less than one hour; and
- Post-traumatic syndrome (PTS) which comprises a symptom complex involving:
  - Dizziness
  - Emotional impairment
  - Intellectual impairment, and
  - Headache.

Applicants with mild brain injury are generally considered to be fit to fly unless there is a history of PTS, which takes more than six months to resolve.

Any alteration of consciousness associated with head trauma is a sufficient indicator of likely brain injury that flying should not be undertaken for at least two weeks — the period during which "early" post-traumatic epilepsy is most likely to occur.

Even in the absence of other risk markers or of a neurological deficit, a more prolonged loss of consciousness and its associated post-traumatic amnesia should be followed by longer periods of suspension from aviation related duties, as follows:

<table>
<thead>
<tr>
<th>PTA &lt; 1 HR</th>
<th>1 month</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTA 1 HR - 24 HRS</td>
<td>3 months</td>
</tr>
<tr>
<td>PTA &gt; 24 HRS</td>
<td>At least 1 year</td>
</tr>
</tbody>
</table>

In all cases, formal confirmation of neurological fitness should precede a return to flying and referral to the Aviation Medicine Section for a final decision is required.

Moderate and Severe Brain Injury

The significant factors in the assessment of head injuries, which produce moderate or severe brain injury, are:

- Extent and nature of any neurological deficit
- Risk of post-traumatic epilepsy (PTE).
2.5.8 Post-Traumatic Epilepsy Markers

A past history of febrile convulsions in childhood and/or a family history of epilepsy doubles the risk associated with any other markers.

Early post-traumatic epilepsy that occurs within the first week following injury carries a 25% risk of later epilepsy. Convulsive movements that accompany an impact head injury do not increase this risk. However, any convulsive activity following the immediate effects of impact, however shortly thereafter these occur, should be considered as "early post-traumatic epilepsy".

Demonstrated haemorrhage within the brain substance, particularly the cortical part, is associated with 25-45% risk of PTE. Depressed fractures or presence of blood in the subarachnoid space are not reliable guides to risk of PTE. However, the presence of such findings should alert investigators to search for bleeding within the brain substance.

Both CT scan and MRI are desirable in assessment of such bleeding. Availability dictates which test is performed. MRI has the advantage of being able to grade breakdown products from blood and can be very sensitive for late imaging where no initial CT or MRI was performed. Where possible an initial CT and/or MRI should be performed. If the history suggests a severe head injury and no initial imaging available a MRI should be performed to detect residual changes associated with bleeding within the brain substance.

A normal MRI should be reassuring.

Other markers are the presence or absence of a post-traumatic amnesic interval of more than twenty-four hours, focal signs, and early post-traumatic epilepsy.

Once the first post-traumatic week (the period of early PTE) has passed, the risk of subsequent PTE decays exponentially. By two years, the residual risk is less than 20% of that immediately post-injury and at four years it is less than 10% of that initially present.

When considering recertification, a residual risk of PTE of 1% or less is acceptable, given that the prevalence of epilepsy in the community is 0.33%.

Conditions that require careful assessment and which most commonly result in a "fail" assessment are: epilepsy, intracerebral haematoma, persisting CSF fistula, primary open cerebral laceration, and the presence of any significant permanent neurological deficit.
2.5 Neurology

Recertification Guidelines

The Aviation Medicine Section applies the following guidelines:

1. Applicants with PTA lasting 30 minutes or less, who after the event have a normal neurological examination and no sequelae, may return to full duties in three to four months if the CT scan is normal.

2. Applicants with PTA from 30 minutes to 24 hours, with a normal MRI and EEG, are acceptable after 12 months. If a seizure occurred in the first week after trauma in an adult, a longer interval before re-licensing is required. Such cases are assessed individually.

3. If there is PTA greater than 24 hours, but Neuro imaging and neuropsychological testing are normal, applicants can be declared fit after two years. Flight simulator testing may provide additional valuable information in these cases.

4. Applicants with head injuries associated with intracerebral haemorrhage or focal deficit, whose neuropsychological testing does not show significant sequelae at 5-7 years post trauma, may return to duties after 7 years. Those who demonstrate abnormal neuropsychological sequelae have been more seriously injured and are considered individually. MRI is essential to determine presence or absence of bleeding.

5. Use of an anticonvulsant may mask the presentation of any PTE. The duration of the seizure free period should be considered as beginning only when applicant is off anticonvulsant medication. Where the risk of further seizures is considered to be too high to cease medication, the applicant is not medically fit for certification.

2.5.9 Neurosurgery

Opening the skull is not necessarily a permanently disqualifying factor for flight crew or ATC certification.

Assessment is based on:

- The underlying disease and its prognosis
- Any neurological deficit
- Surgical approach and any associated induced injury to the brain substance along the approach path
- Any risk of post operative epilepsy secondary to destruction or removal of cerebral tissue
- Location of the supratentorial/infratentorial lesion.

Full reports are required in all cases. DAMEs should issue a “doubtful” assessment and provide explanatory notes.
2.5.10 Cerebrovascular Diseases

These pathologies are usually secondary to or associated with other medical conditions and these should be sought and controlled besides dealing with the presenting cerebrovascular events. Investigations are more informative regarding the causes than the history alone. Imaging by CT scan, MRI or Angiography will differentiate the various types. Other investigations such as lipid profile, stress test for coronary ischaemia, ultrasound of carotid and heart, digital subtraction angiography etc should be considered to address non-cerebral conditions. The treatment of these non-cerebral pathologies may introduce factors affecting aeromedical certification, eg, use of an anticoagulant.

Specialist neurologist assessment is mandatory. Opinion should specifically include the risk of:

- recurrence
- epilepsy
- subtle or acute incapacitation.

Such assessment should be supported by reference to current literature with reasoned opinions.

Where subtle functional changes are suspected, neuropsychological testing to quantify the changes should be undertaken. These tests can be expensive and are open to varying interpretations.

Ischaemia

Assessment of transient ischaemic attacks (TIAs) and reversible ischaemic neurological deficits (RINDs) depend upon their causes.

- **Stenosis.** Although stenotic lesions may be bypassed or treated by endarterectomy, the risk of continuing TIAs and cerebral infarction remains high.

- **Embolism.** The risk of recurrent embolism or of haemorrhage secondary to anticoagulation is high.

- **Postural.** Individual assessment is required, but most instances are related to head movements necessary for flying.

- **Vascular headache.** See earlier section on Headache.

- **Blood hyperviscosity.** This condition may be due to polycythaemia, myelomatosis, Waldenstrom's macroglobulinaemia, etc. These cases are assessed individually and usually result in "fail" assessments if the hyperviscosity cannot be controlled.

- **Hypertension.** If adequate control is established with the use of suitable drugs, these applicants may be considered fit.
All precipitating or associated pathologies should be addressed and separate reports relevant to them included.

Aviation Medicine Section assesses all cases individually.

**Haemorrhage**

There are two major types of cerebral bleeding:

- Intracerebral haemorrhage, producing cerebral infarction
- Subarachnoid haemorrhage.

Most cases are secondary to leakage or rupture of an aneurysm; some are secondary to arterio-venous malformation. Surgery to treat them may cause injury to brain matter with associated post-operative epileptic risk. Details of the surgery should be included in reports.

20% have no identifiable cause but may be related to sustained hypertension or to transient elevation of blood pressure.

All affected patients are at risk of later developing normal pressure hydrocephalus with visual field loss and corresponding subtle incapacitation. This possible complication should be looked for and excluded as part of the follow up of all affected applicants.

Aviation Medicine Section assesses all cases individually.

**Cerebral Infarction**

Applicants who have suffered a cerebral infarct are generally considered unfit for at least one year. Recertification depends on:

- Underlying pathology leading to the stroke
- Absence of neurological deficit
- Risk of recurrence
- Assessed risk of future seizures.
2.5.11 Infections of Central Nervous System

**Meningitis**

All applicants diagnosed with meningitis should not engage in flight duties for six months. Return to flight duties depends on the nature of the infecting agent or cause of meningitis, eg, viral, bacterial or fungal, and the degree of recovery of resultant deficit and risk of development of epilepsy or hydrocephalus.

**Encephalitis**

This is dealt with as for meningitis.

**Brain Abscess**

Assessment is based on the underlying cause and whether the lesion is:

- Supratentorial, in which case the risk of epilepsy and the degree of deficit must be considered, or
- Infratentorial, where the nature and degree of deficit must be considered.
2.5.12 Degenerative Disease

Dementia

Dementia is defined as deterioration in cognitive abilities that impair the previously successful performance of activities of daily living. The examining doctor is in a better position to assess an applicant with possible dementia if there has been contact over some years and changes over time can be more readily appreciated.

Memory loss, particularly short term, is most common and tends to affect executive function. (Planning, initiation and regulating behaviour for systematic, goal-directed activity. It is highly involved in novel situations where long term memory “experience” is not adequate).

In the aviation medical examination, presentation of dementia tends to occur at early stage in the process, with consequently difficult diagnosis. Pathologies that cause secondary dementia should be sought and excluded before a diagnosis of primary dementia is made. Age of onset is not a reliable guide. With aging, frequency of all pathology increases. Dementia, primary or secondary, is one of the many manifestations of increasing age. In the absence of pathology, even advanced age is not a reason for refusal of medical certification.

In early dementia, diagnosis usually is made by exclusion. Where a positive finding is present eg, brain atrophy on CT scan, the diagnosis is more likely. However, the absence of such findings does not preclude the diagnosis. Investigations should be guided by pathologies that produce secondary dementia.

Clinical examination can be formal or informal. Abnormal performance of tasks such as form completion, or following simple instruction such as undressing should be recorded. Mini-Mental State Examination has limitations because of its dependence on the applicant’s linguistic ability, educational level and cultural background, particular in the early and late stages of the condition. Other reasons for poor test performance should be carefully considered before the result deemed positive. If test performance is normal, the presence of dementia is unlikely.

The greatest diagnostic challenge occurs where formal tests appear normal yet a family member or the examiner’s prior knowledge of the applicant indicates the presence of changes in mentation sufficient to cause concern. A flight performance report from instructors should be sought. Formal flight test may be necessarily. Assessment of flight performance must take account of the pilot’s experience and currency. Highly experienced pilots may perform adequately even when mildly impaired. Comparison with previous performance or with that of other pilots’ with similar experience should be sought.

Many dementias are progressive but some may be static. Where dementia has been demonstrated to be progressive, an immediate "fail" assessment is likely.
Note: If dementia is secondary to metabolic disease or correctable organ failure, there may be significant recovery of mental function following effective treatment. Aviation Medicine Section assesses all cases individually.

Normal Pressure Hydrocephalus

Treatment is not effective in preventing progression and subtle incapacitation may develop even in the presence of a working shunt. Assessment will be "fail".

2.5.13 Extrapyramidal Disease

Parkinsonism

This is characterised by:

- Rigidity
- Bradykinesia
- Tremor—although a "resting" tremor eases with movement, stress may produce a "reversal" with worsening of tremor on movement.

Parkinsonism can be a manifestation of other diseases and such causes should be sought and dealt with. Parkinson’s disease is a chronic, progressive disorder of primary Parkinsonism with no evidence of more widespread neurological involvement.

The functional effects of Parkinsonism can be variable. A careful record of neurological deficits, including effect on common activities, should be made. This will serve both as a quantitative appraisal tool and for comparison in evaluating subsequent progression of the condition.

A flight test is an essential component of evaluation. It should be the last of the tests performed and does not replace clinical assessment.

Applicants may be assessed as fit for certification if there is no adverse effect of treatment such as postural hypotension or "on-off" phenomena, and if the following features are adequately controlled:

- Bradykinesia
- Rigidity
- Tremor
- Adjustment of centre of gravity
- Voice quality
- Rapid scan eye movement.
2.5 Neurology

Significant sequelae relevant to aviation safety include:

- Altered colour vision
- Dementia (late phenomenon)
- Depression (early as reaction to diagnosis, or later as a primary phenomenon)
- “On-off” phenomenon: abrupt but transient fluctuation in clinical state within the day, often as complication of levodopa therapy.

Progression to incapacitating symptoms or signs is generally slow. Shortened validity of certification is required to facilitate monitoring of changes. Class 1 certificate holders may require 6-monthly review and restriction to duties ‘as or with co-pilot’. All classes of medical certificate holders will require neurological review at least annually.

Applicants receiving treatment who display "on-off" phenomena will not be certificated to continue flight duties due to the likelihood of rapid onset of incapacitation within the time period of a typical flight.

2.5.14 Demyelinating Disease

Multiple Sclerosis (MS)

MS is characterised by multiple episodes of demyelinating attacks within the central nervous system. Diagnosis cannot be made following a single attack unless confirmed by MRI changes. A single attack with a single lesion on MRI does not confirm the diagnosis. Multiple lesions in the clinical setting of single attack may be consistent with the diagnosis.

The course of the disease can be relapsing-remitting or progressive. In the relapsing-remitting type some patients may remain static for many years while some will relapse at variable frequency. Favourable prognostic features are: isolated optic neuritis or other sensory change, complete recovery, age of onset younger than 40 years, female, fewer than two relapses in the first year of illness and minimal impairment five years after the first presentation.

Progressive type of MS has a 50% probability of functional deficit in daily life activities requiring assistance at 10-15 years from initial diagnosis.

Typical attacks in mild cases have onset over days rather than minutes. However in severe cases, attacks can present as an acute neurological event. Seizure is uncommon.
In all cases, assessment depends upon:

- Nature of symptoms
- Time between exacerbations
- Residual deficit
- Likelihood of sudden incapacitation
- Activity of the disease.

A flight test may be necessary to determine the effect of any residual deficit.

All cases of MS require formal neurological opinion. Aviation Medicine Section assesses all cases individually.

Any subsequent certification will require regular specialist reviews.
2.5.15 Intracranial Tumours

(See also Section 2.14 – Malignancy.)

Three factors affect the aeromedical disposition of applicants with intracranial tumours:

- Malignant or benign
- Treatment modality: chemotherapy, radiotherapy, surgery
- Degree of brain involvement.

Certification of applicants with secondary malignant brain tumours is principally a function of the characteristics of the primary tumour.

Certification of applicants with primary malignant brain tumours depends on prognosis in terms of malignancy and sequelae of any treatment received.

Certification of applicants with benign brain tumours depends on tumour size and location and the effect of any treatment.

**Radiotherapy**

Whole brain irradiation may be associated with late radiation injury effects. Focal irradiation may cause residual changes demonstrated on MRI. Such complications should be monitored for and excluded.

**Chemotherapy**

Systemic effects have to be considered in any aeromedical assessment.

**Surgery**

Effects occur regardless of the tumour’s malignancy. For tumours within the brain, aeromedical concerns are for brain substance loss, with associated neurological deficit, and surgically induced bleeding into brain substance, with associated post-“traumatic” epilepsy.

Essential factors for consideration are:

- **Site of tumour:** supra or infratentorial
- Surgical approach
- Details Of The Surgery: amount of intraoperative bleeding, retraction and compression of brain, and any intraoperative difficulties or complications.
2.5 Neurology

The treating neurosurgeon’s report and opinion on the risk of epilepsy is a mandatory requirement for aeromedical assessment and must include:

- Details of any neurological deficit from brain substance loss or as result of surgical approach
- Risk of epilepsy
- Risk of recurrence of tumour.

Benign tumours not involving brain substance such as meningioma or acoustic neuroma should be considered in terms of:

- Treatment used: radiation and/or surgery
- Severity of compression effect on underlying neural structure: brain or nerve. In respect to brain compression, the potential for epilepsy should be considered.

A report from the specialist involved is required in all cases.

The effect of different treatment combinations and their likely sequelae requires expert neurological opinion on the particular therapy.

If there is no significant neurological deficit, these applicants may be assessed as fit for pilot and ATC duties. Applicants with small tumours, with no significant deficit after treatment by cryotherapy, after which there has been no evidence of epilepsy, may be assessed as meeting the required medical standard or as posing no significant risk to the safety of air navigation.

Applicants with history of childhood cerebellar astrocytoma who have been cured and who have no deficit or history of epilepsy may be assessed as meeting the required medical standard or as posing no significant risk to the safety of air navigation.

For adult subtentorial tumours, Aviation Medicine Section assesses all cases individually.

Nasal approach to pituitary tumours has a low risk of sequelae; the primary aeromedical consideration is endocrine effect and any residual compression effect on the optic nerves.

Malignant tumours fully excised, with or without associated radiotherapy, are considered according to their potential for recurrence, effect of the treatment, and their associated seizure risk. Those treated by radiotherapy alone will require long period of observation, usually in order of years, before the condition can be considered cured. Early certification is unlikely.

Applicant with benign tumours treated by radiation alone will be considered individually, dependent on the siting and any residual pressure effects on surrounding structures.

Benign intraventricular tumours will be considered individually, with any neurological deficit resulting from the surgical approach the main consideration.
2.5.16 Extracranial Neurological Disease

*Peripheral Nerve Diseases*

These disorders are assessed on the basis of the nature and degree of deficit. Autonomic involvement may produce syncope and is generally regarded as incapacitating. Full reports are required.
2.6 Psychiatry

2.6.1 Introduction

This section details the assessment procedures for pilots, other aircrew members and air traffic controllers (ATC) who suffer or who may suffer from psychological disorders or psychiatric disease.

The aim of the psychiatric assessment within the aeromedical examination is to ensure that applicants do not suffer from psychological disorders or psychiatric disease which places them at an increased risk of incapacitation, which may produce a decrement in psychological or higher cortical function, or which may jeopardise the safety of air navigation. A particular concern is the potential for an affected individual to commit an unsafe act that impairs the safe operation of an aircraft.

When conducting the aeromedical examination, the DAME should recognise that an individual who holds an unrestricted medical certificate must be capable of safely performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities (either as a private or a professional pilot) may include flight:

- For prolonged duration, often as part of a shift roster
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning
- Subject to disrupted sleep and time zone changes.

A number of these stressors may also affect Air Traffic Controllers.
2.6.2 The Psychiatric Standard – CASR Part 67

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2.6.3 Psychiatric Assessment

All applicants for Australian aviation medical certificates are required to complete a comprehensive screening questionnaire, to be physically examined by a DAME, and to undertake a number of screening tests.

When conducting the psychiatric component of the aeromedical examination, the DAME should note the presence of relevant risk factors for the development of psychiatric disease and the presence of signs and symptoms suggestive or diagnostic of such conditions. (A Generic Template for an Aviation Psychiatric History is being developed to guide the conduct of an aviation medical psychiatric assessment and will be provided in due course.)

For example, risk factors for the development of alcoholism include:

- Family history of alcohol abuse
- Family or work stresses
- Financial pressures
- Single marital status.

Psychometric testing may assist in making a psychiatric diagnosis and referral to a consultant psychiatrist may be indicated to confirm a diagnosis or to resolve concern over a differential diagnosis. CASA may require a pilot or an ATC to be assessed by a consultant psychiatrist as part of its consideration of an applicant’s fitness for aeromedical certification.
2.6.4 Documentation of Psychiatric Conditions

Psychiatry is a subjective science. DAMEs need to take a careful and thorough clinical history before reaching a psychiatric diagnosis, particularly a diagnosis that may have significant occupational implications for pilots or ATCs. The Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations is provided to assist DAMEs in taking such a history and to bring consistency to their reporting.

In addition to requiring a traditional narrative report of psychiatric illness in aviators, CASA will henceforth require DAMEs and consultants to classify psychiatric conditions in aircrew and ATCs in accordance with the criteria defined in the Diagnostic and Statistical Manual of the American Psychiatric Association (DSM IV). Use of the DSM system will provide CASA with a tool to ensure the uniform assessment of all aircrew and ATCs diagnosed with psychiatric disease and allow CASA to make an informed assessment of the aeromedical risk posed by a particular applicant with a psychiatric condition.

DSM IV categorises psychiatric disorders and disease along several axes:

- **Axis I** - Clinical syndromes
- **Axis II** - Developmental Disorders/Personality Disorders
- **Axis III** - Physical Disorders and Conditions
- **Axis IV** - Severity of Psychosocial Stressors
- **Axis V** - Global Assessment of Function¹.

The first three axes constitute the diagnostic assessment of a patient with a psychiatric condition. Conditions in Axis I (and to a lesser extent Axis II) are those most likely to be of aeromedical concern in the flying safety context. Axis III permits the clinician to indicate any current physical disorder or condition that is potentially relevant to the understanding or management of the case. (These are disorders or conditions listed outside the mental disease section of ICD 10).

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¹ CASA does not require an Axis V assessment. An amended assessment scale for assessing function in Aviators is under consideration.
Axis IV provides a scale for coding the overall severity of the psychosocial stressor(s) acting upon the patient that have occurred in the year preceding the current evaluation and that may have contributed to the development, recurrence or exacerbation of a mental disorder. The rating of severity of the stressor should be based on the clinician’s assessment of the stress an “average” person in similar circumstances and with similar socio-cultural values would experience from the particular stressor(s). Clinicians should also make an assessment as to whether the stressors are acute (less than 6 months) or enduring (greater than 6 months).

Axis V permits the clinician to indicate an overall judgement of a person’s psychological, social and occupational functioning (as an aviator or ATC) on a scale that assesses mental health-illness. Two ratings should be made using this scale; the first an assessment of current function and the second an assessment of best function during the preceding 12 months.

Thus, for example, a DAME reporting on an airman with psychiatric illness may summarise his condition as follows (in addition to providing a narrative of the situation):

Axis I: Major depression: single episode, severe, without psychotic features
       Alcohol dependence
Axis II: Dependent personality disorder
Axis III: Alcoholic cirrhosis of liver
Axis IV: Stressors: anticipated retirement; grounded by company; change of residence; loss of contact with friends
Axis V: (Not required by CASA at present.)
2.6.5 Disorders Diagnosed in Childhood

**Mental Retardation**

This disorder is characterised by significantly sub-average intellectual function with concurrent deficit or impairment in adaptive functioning. Onset is before the age of 18 years. Where the results of standardised, individually administered intelligence tests indicate significant reduction in an applicant’s intellectual performance likely to limit the individual’s ability to control an aircraft and where clinical assessment indicates a deficit in adaptive behaviour, CASA will not issue a medical certificate.

**Learning Disorders**

Learning disorders are diagnosed when an individual’s achievement on individually administered, standardised tests in reading, mathematics or written expression are substantially below that expected for age, schooling and level of intelligence and when such deficits interfere with academic achievement or activities which require such skills. CASA will not issue a medical certificate to an applicant who has a learning disorder that precludes the acquisition of knowledge and information essential to safe flight.

**Motor Skills Disorders**

The essential feature of this group of disorders is a marked impairment in the development of motor coordination sufficient to interfere with academic achievement of activities of daily living. Recognition of this disorder usually occurs in childhood. Clinical course in variable, and in some cases, lack of coordination continues through adolescence into adulthood. In general, CASA will not issue a medical certificate to an applicant who suffers an impairment of motor skill sufficiently severe to threaten the safety of flight.

**Communication Disorders**

CASA will not usually issue a medical certificate to an applicant who suffers a communication disorder severe enough to compromise effective communication in the aviation environment. Practical testing may be required to establish the effectiveness of an applicant’s communication abilities.
**Pervasive Development Disorders**

These disorders are characterised by severe and pervasive impairment in several areas of development relative to an individual’s developmental level or mental age. Autistic Disorder is the commonest of these disorders. The essential features of an individual with this disorder are impairment in reciprocal social interaction (which is gross and sustained), impairment in communication skills and markedly restricted repertoire of activity and interests. The symptoms and characteristics of autism can present in a wide variety of combinations, from mild to severe.

Other conditions in this group include Rett’s Disorder, Asperger’s Disorder and Childhood Disintegrative Disorder.

Sufferers of disorders in this group will usually be precluded from holding CASA medical certification.

**Attention Deficit/Hyperactivity Disorder (ADD/ADHD) and Disruptive Behaviour Disorders**

This disorder is amongst the most common neuro-developmental disorders found in children. Its hallmarks are hyperactivity, impulsiveness and inattention beyond the norm for a child’s age. There may be wide variations apparent in the severity of this disorder. Other psychiatric conditions frequently co-exist in children suffering ADD/ADHD. While the diagnosis is reliable if made to the criteria outlined in DSM IV, concerns over the validity of the diagnosis in a particular individual are frequently expressed. Sufferers of ADHD/ADD are significantly more likely to be involved in motor vehicle and industrial accidents (whether on pharmacological treatment or not) than similar groups of individuals who do not suffer from this condition(s).

Aeromedical concerns relate to the capacity of a sufferer of ADD/ADHD to safely control an aircraft and to the potential adverse effects of amphetamine medications frequently utilised to treat this condition. To consider an application for aeromedical certification from a sufferer of ADD/ADHD, CASA requires a thorough assessment of the applicant by a consultant psychiatrist (to confirm the diagnosis against the criteria indicated in DSM IV and exclude other conditions) and the results of neuropsychological testing. Where evidence exists of persisting deficiencies in cognitive ability, behavioural aberrancy or where an applicant requires continued use of amphetamine medication, the applicant will not be aeromedically certificated.

Refer to the **Criteria for the Diagnosis of ADD/ADHD**.
**2.6 Psychiatry**

**Conduct Disorder (Antisocial Personality Disorder of Childhood)**

The essential feature of conduct disorder is a repetitive and persistent pattern of behaviour in which the basic rights of others or major societal norms or rules are violated. CASA will not usually consider certification for a medical certificate to an applicant with a substantiated history of conduct disorder.

**Oppositional Defiant Disorder**

The major feature of this condition is a recurrent pattern of negativistic, defiant, disobedient or hostile behaviour towards authority figures that often develops gradually in childhood and may continue into adolescence and even into adulthood. CASA will not usually consider medical certification for an applicant with a substantiated history of oppositional defiant disorder.

**Tic Disorders**

A tic is a sudden, rapid, recurrent, non-rhythmic, stereotyped motor movement or vocalisation. Tics may be simple or complex, may exist in isolation or be part of a condition such as Tourette’s Syndrome. Where an applicant’s tic is believed to have implications for the safety of air navigation, CASA will not issue a medical certificate. Sufferers of Tourette’s Syndrome will usually be precluded from holding medical certification.
2.6.6 Delirium and Dementia

Delirium

Delirium is a disturbance of consciousness, accompanied by a change in cognition that is not due to pre-existing or evolving dementia. The disturbance generally develops over a short period, and often fluctuates during the course of a day. There is generally evidence from the clinical assessment of the aetiology of the delirium which may be due to a general medical condition, substance intoxication/withdrawal, use of medication, toxin exposure or a combination of these factors.

Aviators and ATCs with acute delirium should immediately be stood down/stand down from flying or controlling duty. CASA will only consider aeromedical certification once the applicant has recovered from the delirious state, and the underlying cause of the delirium has been identified and remedied.

Dementia

Dementias are characterised by the development of multiple cognitive deficits (including memory impairment and one or more of the following cognitive disturbances: aphasia, apraxia, agnosia, or a disturbance of executive functioning). While dementias share a common symptom presentation they may be differentiated on the basis of aetiology.

It may be difficult to make a diagnosis of early dementia in an individual who has enjoyed a well paid and responsible position in the aviation community for many years, but who is finding it impossible to learn new skills and to retain them (e.g. changing aircraft type). Anxiety or mood disorders may co-exist. Sympathetic handling and possibly psychological evaluation may prove helpful and the latter may be necessary to exclude or establish a diagnosis of pre-senile dementia. In such cases the decision about medical certificate revalidation will need to be based upon a very careful evaluation of all clinical and occupational information.

Once an applicant demonstrates a significant impairment of memory and other cognition, he/she should refrain from exercising the privileges of the pilot or ATC licence. CASA will not usually issue an aviation medical certificate to a sufferer of dementia.
2.6.7 Mental Disorders due to medical conditions not classified elsewhere

Reserved.

2.6.8 Substance Related Disorders

This group of disorders includes disorders related to the problematic use of a drug, including non-prescription medications, prescribed medications and drugs of abuse (e.g. alcohol, cocaine), other substances (e.g. volatile solvents) and to toxin exposure. For CASA purposes, this classification does not include nicotine abuse disorder. Some prescription drugs, whilst legally prescribable, are inappropriate when used by pilots or ATCs in the aviation environment (e.g. MS Contin). The safety of medications is dealt with in Section 2.13 Medication – Drugs and Flying/Controlling. The substance related disorders are divided into two major categories: the substance use disorders (abuse and dependence) and the substance induced disorders (substance induced intoxication, withdrawal, delirium, dementia, amnesia, psychosis, anxiety, mood, sexual dysfunction and sleep disorders). CASA will not usually issue an aviation medical certificate to a pilot or ATC who suffers a substance abuse disorder or who is involved in the problematic use of drugs.

Drug Testing

Current CASA practice is to ask all applicants for aeromedical certification (original and renewal), about possible problematic use of drugs and substances. DAMEs should also look for evidence of drug or substance use/abuse in their assessment of applicants.

Applicants who admit to the problematic use of drugs/substances or whom the DAMEsuspects of drug/substance abuse on the basis of other history or examination findings are required to submit a urine sample for drug screening. Urine samples for drug testing purposes should be provided as part of and at the time of the DAME medical certificate examination and should be passed under the direct supervision of the DAME. The sample should then be split into two clean containers and each sealed, the applicant being offered his/her choice of samples for independent testing. The other sample is to be forwarded to the testing pathology laboratory by the DAME. (Under no circumstances is this sample to be given to the applicant). Urine drug testing required by CASA is to undertaken at the applicant's expense.

As a minimum, urine samples should be tested for the following groups of drugs: cannabinoids, amphetamines, cocaine analogues, hallucinogens, opiates, sedatives and phencyclidine analogues. In addition, the requesting DAME should request testing for any other drug/substance that he/she suspects that the applicant may be using/abusing.

Any applicant who returns a positive urine drug screen and thus confirms his/her problematic use of drugs/substances does not meet the relevant medical standard. CASA will not issue a medical certificate unless an explanation acceptable to CASA is provided.
Alcohol Abuse/Alcoholism

A number of alcohol related syndromes are described:

- **Acute intoxication** with alcohol is a concern in the aviation workplace by virtue of the way in which it impairs psychomotor performance that may potentially lead to accidents and injury. The potential for catastrophic outcomes in the aviation environment arguably render it impossible to consider any episode of acute intoxication in a pilot on duty as “uncomplicated”. Current CARs provide specific requirements on “bottle to throttle time” for pilots and ATCS and it is intended that the new CASRs, when published, will limit the blood alcohol concentration of pilots and ATCs.

- **Harmful use of alcohol** is associated with damage to the physical or mental health of the individual; in the absence of a diagnosis of the alcohol dependence syndrome. Certain specific and severe consequences of alcohol misuse may also be diagnosed separately – notably alcoholic hallucinosis, Korsakoff’s psychosis and alcoholic dementia.

- **The alcohol dependence syndrome** is a cluster of biological, psychological and social phenomena that may be diagnosed where three or more of the following features are identified during the preceding year:
  - A strong desire/compulsion to drink
  - Difficulties in controlling drinking
  - A physiological withdrawal syndrome associated with abstinence
  - Increased tolerance to alcohol
  - Neglect of other activities due to drinking
  - Persistence of drinking despite harmful consequences.

- **Alcohol withdrawal** is associated with mild to severe symptoms, including sweating, nausea, tremor and anxiety. However, it may be associated with serious complications, including convulsions or delirium (“delirium tremens”).

- An isolated **drink driving offence** does not fulfil ICD-10 criteria for harmful use of alcohol (although it does fulfil DSM-IV criteria for alcohol abuse) and CASA will generally not take action in response to a single episode of PCA. However, such offences do indicate an increased probability that other alcohol related problems might be identified, and this probability increases still further where there have been multiple drink-driving offences committed.

**Note:** The FAA prohibits the medical certification of pilots who are convicted of two or more drink-driving offences within a 3-year period.
Medical Assessment

The experience of certain major airlines and licensing authorities is that success in rehabilitation of the alcohol dependent pilot can best be achieved by early intervention and treatment, adhering to the strict protocol outlined below. By using this program it has been possible to return aircrew to active flying within four months.

- **Immediate action.** A pilot or air traffic controller must be assessed as temporarily unfit on reasonable suspicion of:
  - intoxication whilst on duty
  - harmful use of alcohol
  - alcohol dependence
  - other alcohol related problems.

Such an assessment may be taken by the airline’s own medical officer, by the DAME or by CASA, or by a member of flight crew or operations staff.

Where a pilot is thought to be intoxicated whilst on duty, particular care and sensitivity are required and the specific action taken may depend, in part, upon the company drug and alcohol policy. However, where possible, it is important to obtain an objective assessment of the alleged intoxication at the earliest opportunity. This might involve use of a breath alcoholmeter, a blood alcohol analysis or urinary drug testing. Such procedures may only be conducted with the patient’s consent. Given that blood alcohol concentration falls fairly rapidly with abstinence, such testing should be conducted as soon as possible. Refusal of testing, and any reasons given for this, should also be recorded carefully. A period of less than 4 hours between detection and testing is considered usual.

- **Treatment and rehabilitation.** If psychiatric opinion and examination confirm “alcohol abuse with or without dependency”, then a residential in-patient program is a mandatory requirement if revalidation is to be considered. The treatment program undertaken should be directed by the treating psychiatrist and may or may not include pharmacotherapy.

Where the diagnosis is considered not to constitute “alcohol abuse with or without dependency” but where there is still a degree of concern regarding an alcohol related matter, then a less intensive treatment may be indicated. For example, such treatment may comprise a day-patient program, or outpatient counselling. The circumstances in which this may be offered must be a matter of judgement. (Arguably, heavy drinking as a cause of an elevated GGT or hypertension, but without any other complications or problems, might be an example of such circumstances.)
Follow-up and monitoring. DAMEs or CASA should be advised as soon as treatment is considered necessary so that follow-up review may be arranged to commence immediately following discharge from in-patient care. The patient should be reviewed immediately after discharge from in-patient care and on-going review should be at 3 monthly intervals (or more frequently if indicated) for at least 2 years, and less frequently thereafter. Overall monitoring should continue for not less than 3 years and in most cases will continue virtually indefinitely, or until the pilot retires. This is because of the significant risk of relapse, which continues for many years following treatment. Review will require supportive, corroborative evidence of continuing abstinence from the family, the family doctor and from others in close contact at home or in the workplace. At each review blood tests should be repeated as support for the monitoring process (see above).

Continued attendance at Alcoholics Anonymous or an equivalent organisation is required in most cases. It is also desirable that a peer group member on the same aircraft fleet should act as a “buddy” to supervise the individual’s progress and report to the relevant authority at intervals.

Treatment goals. Total abstinence will usually be the only acceptable treatment goal. For less serious cases (e.g. an elevated GGT with no other evidence of problems arising from alcohol consumption), an attempt at controlling drinking may be allowed, and in such circumstances in-patient treatment will not be required. However, this will be the exception rather than the rule and, in cases of doubt, in-patient treatment and abstinence should both be considered essential for recertification.

Certification. At the end of the first four months of treatment, and provided that abstinence is secure, the pilot may be allowed to resume his/her flying role but only in a multicrew capacity. A period of at least two years multicrew limitation will be required, assuming good progress, before solo operations will be authorised. Failure to enter the program or to maintain the protocol will lead to continued suspension of the medical certificate.

Recidivism. Recidivists will usually be disqualified from holding an aviation medical certificate and will not be considered for further certification.
2.6 Psychiatry

Reinstatement of Aeromedical Certification

Applicants who are disqualified from holding an aviation medical certificate as a result of problematic use of drugs/substances (including alcohol) may subsequently be certified at any class provided they meet the following requirements:

a. The applicant completes a detoxification program (if relevant to the management of the drug/substance condition—eg, alcoholism)

b. The psychiatrist/drug rehabilitation specialist managing the applicant's case assesses the applicant and provides a report confirming the applicant's abstinence and prognosis

c. The applicant enters a program of random drug testing/performance assessment at the direction of CASA to confirm continued abstinence.

d. The applicant enters an appropriate peer support program

e. The applicant is regularly reviewed by a psychiatrist/substance abuse specialist and a report is provided to CASA 6 monthly (in the first year).

Applicants will not usually be granted medical certification within 12 months of diagnosis/disqualification for substance abuse. Applicants who have been treated for alcohol related conditions may be considered for medical certification 4 months after detoxification is complete.

Recidivism

Recidivists will usually be disqualified from holding an aviation medical certificate and will not be considered for further certification.
2.6.9 Schizophrenia and Psychotic Disorders

These disorders are grouped together as they frequently include psychotic symptoms as a prominent aspect of their presentation (“psychotic” refers to an “inability to test reality” as evidenced by the presence of delusions, prominent hallucinations, disorganised speech, disorganised or catatonic behaviour).

An established history of schizophrenia or psychotic disorder is an absolute contraindication to aeromedical certification of pilots and ATCs. Occasionally aircrew who can unequivocally be established to have experienced a temporary psychotic episode which, has ceased and is reasonably expected never to recur (e.g. psychosis secondary to an organic, toxic or metabolic cause) may be considered for certification. In such cases, certification will be based on psychiatric and other expert advice on the risk of recurrence.

Applicants and licence holders rarely inform CASA when they are diagnosed with schizophrenia or other psychotic illnesses. Such individuals may have little insight into their illness and may attempt to continue flying/controlling. DAMEs and other medical practitioners who are aware of a patient who holds a pilot or ATC licence and who is suffering from a psychotic illness should immediately notify CASA’s Aviation Medicine Section and, where appropriate, notify the medical certificate holder that this is being done. While this may be personally difficult, the risk posed to the safety of the public as well as to the individual by a psychotic medical certificate holder or applicant is such that notification of CASA is entirely appropriate. The Civil Aviation Regulations and the Civil Aviation Safety Regulations indemnify any medical practitioner who acts in good faith in such circumstances.
2.6.10 Mood Disorders

**Major Depression**

Major depressive disorder is characterised by a clinical course involving one or more episodes of major depression without a history of manic, mixed or hypomanic episodes. Major depressive disorder may have an extremely variable course with some patients experiencing episodes of severe depression separated by long periods without depressive symptoms of any sort, while other patients are entirely debilitated by their almost unrelenting condition. At least 60% of individuals who have a single episode of severe depression will experience further episodes, and 90% of individuals who have had three episodes of severe depression will have subsequent episodes. A significant aeromedical concern is the high mortality associated with this condition, as up to 15% of patients with major depression die by suicide.

However, major depression is also commonly relatively mild in its manifestation and readily treated. Assessment of the aviation risk is thus problematic and is based on considerations such as the worst state the patient has experienced during an episode and the suicide/homicide risk during their worst state. The presence of a significant risk at any time during the course of a depressive illness will be disqualifying for pilots and ATCs. A specialist psychiatric opinion should be sought in any case where there is uncertainty about patient status.

**Bipolar I Disorder (Mania with/without Major Depression)**

The essential feature of this disorder is a clinical course characterised by the occurrence of one or more manic episodes or mixed episodes. More than 90% of individuals who have an episode of mania will go on to have future episodes. Such individuals frequently suffer one or more episodes of major depression or other psychiatric co-morbidities. Completed suicide occurs in 10-15% of such patients.

Bipolar disorder is disqualifying for pilots and ATCs.

**Bipolar II Disorder (Hypomania with Major Depression)**

The essential feature of this disorder is a clinical course characterised by the occurrence of one or more major depressive episodes accompanied by at least one hypomanic episode.

Bipolar disorder is disqualifying for pilots and ATCs.
Cyclothymic Disorder (Numerous Brief Episodes of Hypomania and Minor Depression)

The essential feature of cyclothymic disorder is a chronic fluctuating mood disturbance involving numerous periods of hypomanic symptoms and numerous episodes of depressive symptoms over a period of years (where neither hypomanic nor depressive symptoms are severe or prolonged enough to meet diagnostic criteria for a manic depressive episode). Cyclothymic disorder usually begins insidiously in adolescence and has a chronic indolent course into adulthood. Approximately 15% of sufferers will subsequently develop Bipolar I or II disorder.

Dysthymic Disorder (Prolonged Minor Depression without Mania/Hypomania)

The essential feature of dysthymic disorder is a chronically depressed mood that occurs on most days for several years. Affected individuals describe themselves as being chronically sad or “down in the dumps”. During periods of depressed mood, additional symptoms of depressed appetite, sleep disturbance, low energy levels, low self-esteem, poor concentration and feelings of helplessness may be present. Up to 75% of patients with dysthymic disorder will develop major depression within 5 years.

Pilots and Air Traffic Controllers with dysthymic disorder will not be certificated while they are symptomatic. On remission of symptoms, successfully treated applicants with a good prognosis may be certificated on the basis of a report from a consultant psychiatrist that indicates that the applicant is in remission and at low risk of behaviour that may compromise aviation safety.
Use of Antidepressant Medication by Depressed Pilots and Air Traffic Controllers

CASA may, on a case-by-case basis, certificate applicants who are prescribed (and are taking) the antidepressant medications Sertraline, Citalopram and Venlafaxine as treatment for their depression. CASA is reviewing the antidepressant Moclobemide for possible approval for use by aviators and ATCs. An “as or with co-pilot” or “with direct air traffic controller supervision” condition, as appropriate, may be imposed. Pilots and ATCs taking other types of anti-depressants will not usually be considered for certification.

CASA certification of pilots and ATCs taking CASA authorised medications is conditional on:

- Such applicants being under the care of a medical practitioner experienced in the management of depression—the applicant must:
  - Be stable on an established and appropriate dose of medication for at least four weeks before returning to flying/ATC duties and exhibiting:
    - Minimal acceptable side-effects
    - No drug interactions or allergies
  - Be subject to clinical review monthly or more often, with progress reports to CASA at 6 monthly intervals (for at least the first year). The applicant may be involved in other concurrent treatment (e.g. psychotherapy).
  - Have an absence of other significant psychiatric co-morbidities
  - Have no other psychoactive medications
  - Have precipitating factors removed/controlled.

- Symptoms of depression being well controlled, without evidence of psychomotor retardation

- An absence of suicidal ideation or intent

- An absence of features of arousal (e.g. irritability or anger)

- The presence of a normal sleep pattern.

Pilots or ATCs authorised to fly or perform duties when taking Selective Serotonin Re-uptake Inhibitor (SSRI) or related antidepressant medications must cease exercising the privileges of their licences if their antidepressant medication is altered or the dose changed. Their supervising medical practitioner may return them to duty when they are assessed as stable and without unacceptable side effects.

Pilots and ATCs whose medication is being reduced must cease exercising the privileges of their licences for the entire period during which they are weaned off medication plus an additional period of two weeks. Their supervising medical practitioner may return them to duty when they are assessed as stable and without unacceptable side effects.
2.6.11 Anxiety Disorders

DSM IV has eliminated the term neurosis, and dispersed the diagnoses from this former category of disorders amongst four other headings:

- Mood disorders
- Anxiety disorders
- Somatoform disorders
- Dissociative disorders.

Because panic attacks and agoraphobia may occur in the context of any anxiety disorder as well as in association with other mental disorders, they are defined separately hereunder.

**Panic attacks**

Panic attacks are discrete episodes in which an individual experiences a sudden onset of intense apprehension, fearfulness or terror, often associated with feelings of impending doom. During these episodes, symptoms such as shortness of breath, palpitations, chest pain or discomfort, choking/smothering sensations, and fear of “going crazy” or losing control may be present. Attacks occur suddenly, may be unpredictable and usually build to a maximum within 10-15 minutes. CASA will not usually grant aeromedical certification to an individual who suffers non-specific or unpredictable panic attacks.

**Agoraphobia**

The essential feature of agoraphobia is extreme anxiety about being in places or situations from which escape may be difficult (or embarrassing) or in which help may not be available in the event of having a panic attack. The anxiety typically leads to a pervasive avoidance of a variety of situations. Such avoidance may impair an individual’s ability to work or to carry out other responsibilities. CASA may grant aeromedical certification where an applicant’s agoraphobia is unrelated to the aviation environment or unlikely to affect aviation safety adversely.

**Specific Phobia**

The essential feature of this disorder is a marked and persistent fear of clearly discernible, circumscribed objects or situations. Exposure to the phobic stimulus almost invariably provokes an immediate anxiety response. CASA may grant aeromedical certification where an applicant’s specific phobia is unrelated to the aviation environment or is unlikely to affect aviation safety adversely.
Social Phobia (Fear of Embarrassment)

This condition is marked by a significant and persistent fear of social or performance situations in which embarrassment may occur. Exposure to such situations almost invariably provokes an immediate anxiety response and may reduce an affected individual’s ability to function in social and occupational circumstances. Most sufferers of this condition avoid these social/performance situations but some may endure such situations with dread. CASA will not usually grant aeromedical certification to an individual who suffers from non-specific or unpredictable social phobias.

Obsessive-compulsive Disorder (Obsessive Thoughts and Compulsive Rituals)

Obsessions are persistent ideas, thoughts, impulses or images that are experienced as intrusive and inappropriate and that cause marked anxiety or distress. Compulsions are repetitive behaviours or mental acts whose goal is to prevent or reduce anxiety or distress. In most cases, an individual with a compulsion feels driven to perform a compulsion to reduce the distress that accompanies the obsession or to prevent some dreaded event or situation. Eventually, the sufferer recognizes that the obsession or compulsion is excessive or unreasonable but feels powerless to prevent it. These disorders may cause marked distress, be extremely time consuming or significantly interfere with an individual’s normal social or occupational circumstances. CASA will not usually grant aeromedical certification to an individual who suffers from obsessive-compulsive disorder.

Post-traumatic Stress Disorder (Non-acute Psychological Consequences of Previous Trauma)

The essential feature of Post-Traumatic Stress Disorder (PTSD) is the development of characteristic symptoms following exposure to an extremely traumatic stressor. Such stressors include a personal near death experience, witnessing the severe injury or death of another or the violent or unexpected death of a family member. An individual’s response must involve intense fear, helplessness, or horror. The characteristic symptoms resulting from exposure to the extreme stressor include persistent re-experiencing of the trauma, avoidance of the stimuli associated with the trauma, numbing of general responsiveness and persistent symptoms of increased arousal. PTSD can occur at any age and symptoms generally begin within 3 months of the precipitating event. CASA will not usually grant aeromedical certification to an individual who is suffering from acute symptoms of PTSD. Certification may be considered once an individual’s symptoms are controlled and the applicant is considered to pose no threat to the safety of air navigation.
Acute Stress Disorder

This condition is characterised by the development of anxiety, dissociative or other psychological symptoms within one month of exposure to an extremely traumatic stressor. Generally symptoms of acute stress disorder begin shortly after exposure to the stressor, peak after 2-5 days, and resolve within a month (otherwise the diagnosis should be changed). CASA will not usually grant aeromedical certification while individual is experiencing an acute stress reaction. Once the condition has resolved, return to flying or ATC duties is likely.

Generalised Anxiety Disorder

In this disorder an individual is afflicted by excessive anxiety about a number of events or activities. The symptoms occur on the majority of days and the individual finds it difficult to control the symptoms. The anxiety and worry are accompanied by one of more of the following:

- Restlessness
- Easy fatigability
- Difficulty concentrating
- Irritability
- Muscle tension
- Disturbed sleep.

Many individuals suffering generalised anxiety disorder report they have been nervous and anxious all of their lives. The clinical course is chronic and fluctuating. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.
2.6.12 Somatoform Disorders

The common feature of this group of disorders is the presence of physical symptoms that suggest an underlying physical condition, but are not explained by that medical condition. The symptoms cause clinically significant distress or impairment in social, occupational or other areas of functioning and are not intentional.

Somatization Disorder

In somatization disorder, the patient experiences multiple symptoms including pain, gastrointestinal symptoms, sexual dysfunction and pseudo-neurological symptoms over several years. Characteristically, this disorder begins before the age of 30 and has a chronic fluctuating course that rarely remits completely. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

Undifferentiated Somatoform Disorder

The essential feature of this disorder is the presence of one or more physical complaints that persist for six months or longer. Symptoms include chronic fatigue, loss of appetite, gastrointestinal or genitourinary symptoms. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

Conversion Disorder

This disorder involves unexplained symptoms or deficits affecting voluntary motor or sensory function suggesting a neurological or other general medical condition. Psychological factors are judged to be associated with the symptoms or deficits. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

Pain Disorder

In pain disorder, the predominant focus of clinical attention is pain. Psychological factors have an important role in the severity, exacerbation or maintenance of this disorder. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

Hypochondriasis

This condition is the preoccupation with the fear of having, or the idea that one has, a serious disease based on a patient’s misinterpretation of bodily symptoms or functions. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.
Body Dysmorphic Disorder

This condition is the preoccupation with an imagined or exaggerated defect in physical appearance (in contrast to anorexia and bulimia where the morbid focus is on body weight). CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

2.6.13 Factitious Disorders

Factitious disorders are characterised by physical or psychological symptoms that are intentionally produced or feigned in order to assume a “sick role”. In contrast to malingering, the motivation of sufferers of factitious disorders is psychological and there is an absence of external incentive for the behaviour. Other psychiatric co-morbidities are frequently present. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

2.6.14 Dissociative Disorders

The essential feature of this group of disorders is a disruption in the integrated functions of consciousness, memory, identity or perception. The disturbance may be sudden or gradual in onset, and may be transient or chronic. Dissociative amnesia, dissociative fugue, dissociative identity disorder, and depersonalisation disorder are included in this group of disorders. CASA will not usually grant aeromedical certification to an individual who suffers from these conditions. Aeromedical certification may be considered should the condition resolve.
2.6.15 Sexual and Gender Identity Disorders

**Sexual Dysfunctions**

This group of disorders is characterised by disturbance in sexual desire and in the psychophysiological changes that characterise the normal human sexual response. They may cause marked distress and interpersonal difficulty. In general, these disorders are not of aeromedical concern unless the associated psychological distress intrudes on an individual’s ability safely to control and aircraft or perform duty as an ATC.

**Paraphilias**

The essential feature of this group of conditions is recurrent, intense, sexually arousing fantasies, sexual urges or behaviours involving non-human objects, the suffering of oneself/others, or the non-consensual participation of others in such activities. Affected individuals are rarely self referred and usually come to attention when their behaviour has brought them into conflict with their sexual partners, society, or has reduced on their social, occupational or other areas of functioning.

Affected applicants will not usually be aeromedically certificated until the issues that brought them to attention have been resolved. Successfully treated applicants with a good prognosis may be certificated on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.

**Gender Identity Disorders**

Patients with gender identity disorder experience strong and persistent cross-gender identification and a persistent discomfort about their assigned sex. The diagnosis depends on evidence of clinically significant distress or impairment in social, occupational or other areas of functioning.

Affected applicants will not usually be aeromedically certificated until the source of the distress or impairment is dealt with, and if appropriate, gender reassignment has been completed. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.
2.6.16 Eating Disorders

**Anorexia Nervosa**

The essential features of this condition are refusal to maintain a minimally normal body weight, intense fear of gaining weight, and significant disturbance in perception of shape/size of the body. Restrictive and binging/purging subtypes of this condition are identified. Many persons with anorexia nervosa exhibit depressive symptoms, others may be obsessive-compulsive, while others may have feelings of ineffectiveness, a strong desire to control the environment, inflexible thinking, limited social spontaneity, perfectionism, restrained initiative and depressed emotional expression. While some persons recover from anorexia completely, others have a relapsing course and the overall mortality of this condition approaches 10%.

CASA will not usually aeromedically certificate applicants who are actively anorexic. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.

**Bulimia Nervosa**

The essential features of this condition are binge eating and use of inappropriate compensatory methods to prevent weight gain. Persons with bulimia also place an excessive emphasis on their body shape. They are frequently depressed or suffer mood disorders and many also meet the criteria for the diagnosis of personality disorder. The lifetime prevalence of substance abuse disorders involving alcohol or stimulants is at least 30% among persons with bulimia.

CASA will not usually aeromedically certificate applicants while they are actively bulimic. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.
2.6.17 Sleep Disorders

Primary Sleep Disorders

This group of disorders includes the dyssomnias (including insomnia, hypersomnia and narcolepsy which are characterised by abnormalities in the amount, quality or timing of sleep) and the parasomnias (characterised by abnormal behavioural or physiological events occurring in association with sleep). Of primary aeromedical concern is the failure of sufferers from these conditions to gain sufficient restorative sleep to ensure optimum alertness and cognitive function when performing duties as pilots and ATCs. Applicants for aeromedical certification will only be considered if studies confirm normal alertness during waking hours (with or without treatment). (Also see Section 2.3 Medical Aspects – Respiratory Disease.)

2.6.18 Impulse Control Disorders

The essential feature of impulse control disorders is failure to resist an impulse, drive, or temptation to perform an act that is harmful to the person or to others. CASA will not usually grant aeromedical certification to individuals who are diagnosed as suffering from such disorders.
2.6.19 Adjustment Disorders

An adjustment disorder may be identified when a person, within three months of an event or stress, develops clinically significant emotional or behavioural symptoms. Such symptoms are either greater than would be generally expected, given the nature of the stressor, or lead to significant impairment in social, educational or occupational function. Stressors may be single or multiple, recurrent or continuous, and may affect either a single person or a group. Patients with adjustment disorders may experience symptoms of depression, anxiety, or may manifest disturbances of conduct. Adjustment disorders generally have a good prognosis and usually remit within six months of the stressor or its consequences ceasing.

Pilots or ATCs should not exercise the privileges of a licence whilst suffering symptoms of an acute adjustment disorder. In some cases, a medical certificate may be suspended. Once psychiatric opinion confirms that the symptoms associated with the adjustment reaction have abated and the acute stressor has been removed or overcome, CASA will usually issue an unrestricted medical certificate.

Personality Disorders

Personality disorders are characterised by enduring patterns of thought and behaviour that deviate markedly from the expectations of a person’s culture. These patterns, which usually begin in adolescence or early childhood, are pervasive, frequently inflexible, stable over time and cause distress, social impairment and often occupational difficulties. A number of specific personality disorders are identified including: antisocial personality disorder; (impulsive, aggressive, manipulative); borderline personality disorder (impulsive, self-destructive; unstable), dependent personality disorder (dependent, submissive, clinging); Histrionic personality disorder (emotional, dramatic, theatrical); narcissistic personality disorder (boastful, egotistical, “superiority complex”); obsessive-compulsive personality disorder (perfectionist, rigid, controlling); paranoid personality disorder (suspicious, distrustful); and, schizoid personality disorder (socially distant, detached), etc.

While personality traits are unique and may enable a person to excel in a particular field, individuals with identifiable personality disorders are likely to have attitudes or perform acts that may be prejudicial to flight safety. Such individuals fail to meet CASA’s psychiatric medical standards and will usually be disqualified from aeromedical certification. Certification may be considered if specialist psychiatric opinion confirms that a pilot or ATC with a personality disorder represents a low risk to aviation safety.
2.6.20 Other Psychiatric Conditions which may be the Focus of Clinical Attention

Suicidal Ideation or Gesture

Suicide and attempted suicide are not psychiatric diagnoses per se, but rather symptoms of underlying psychiatric disease. Furthermore, it is uncommon for an individual to use an aircraft as a means of committing suicide.

Those who commit suicide are more often male. The act is carefully planned, precautions taken against discovery, and the method is often violent. The majority of those who suicides are suffering from a depressive disorder, many having significant social problems, and alcohol misuse is a feature in about 15% of cases. In the younger age groups personality disorders are frequently diagnosed, because they are often associated with alcohol or drug misuse, and adverse social factors. Deliberate self-harm is usually an impulsive act, committed in such a way as to invite discovery. Over dosage with minor tranquillisers, antidepressants and non-opiate analgesics is common. Frank major psychiatric illness is uncommon.

In assessing potential risk the following factors should be considered:

- A history of direct statement of intent
- A history of previous self harm
- A previous or current depressive disorder, particularly in the early phase of recovery
- Alcohol dependence, particularly with severe physical or social complications
- Drug dependence
- Social deprivation or loneliness.

Certification may be considered if specialist psychiatric opinion confirms that a pilot or ATC who has attempted or considered suicide represents a low risk to aviation safety. Applicants who have a history of multiple suicide attempts will not usually be granted a medical certificate.
Fear of Flying

DSM IV identifies as a true simple phobia the overt, unabashed, and long-standing fear of flying which usually occurs in people who are not aviators. When an experienced aviator who previously enjoyed flying presents with “fear of flying” it may represent a complex mix of more acute causes and symptoms’ presentations. In such fearful fliers, anxiety about symbolic threats may overlay a rational fear of actual risks; this may represent a reaction to a near or actual accident, or displaced anxiety from a personal crisis. If the flier is not consciously aware of the fear, the focus may be on vague or trivial somatic symptoms, presented in a setting of "I'd like to fly, but—." This attitude presents a striking clinical contrast to the more usual tendency of fliers to understate, if not actually deny, signs and symptoms that they believe may disqualify them from medical certification.

An episode of spatial disorientation or of hyperventilation in flight may trigger intense symptoms of anxiety. Loss of motivation to fly may undermine previously adequate means of coping with the true dangers of flight, particularly in professional aviators. An accident involving the flier or a friend may overwhelm mental defences against such a possibility. Interpersonal conflicts with significant individuals in a non-aviation setting (home, office) may precipitate aviation-related anxieties without any obvious connection to flying except the time of onset.

Whatever its genesis, CASA will not medically certificate a pilot who suffers symptomatic fear of flying until its causes are delineated and the fear has been successfully treated.
2.6 Psychiatry
2.7 Nephrology and Urology

2.7.1 Introduction

This section details the assessment of pilots, other aircrew members and Air Traffic Controllers (ATC) who suffers or who may suffer from renal disease or from urological disorders.

The aim of the renal assessment within the aeromedical examination is to ensure that applicants do not suffer from renal or urological conditions which place them at an increased risk of incapacitation or which may produce a decrement in physiological or psychological function sufficient to jeopardise the safety of air navigation. In conducting the aeromedical examination, the DAME will recognise that an individual who holds an unrestricted medical certificate must be capable of performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities may include flight (either as a private or professional pilot):

- For prolonged duration, often as part of a shift roster
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning, and
- Subject to disrupted sleep and time zone changes.

A number of these stressors may also affect ATCs.
2.7.2 Urinary Standard – CASR Part 67

The urinary standards are found in the following paragraphs of CASR Part 67:

- **CASR 67.150**
  - For medical standard 1
  - CASR 67.150(7)
  - Table 67.150
  - 1.19 – 1.22

- **CASR 67.155**
  - For medical standard 2
  - CASR 67.155(7)
  - Table 67.155
  - 2.18 – 2.21

- **CASR 67.160**
  - For medical standard 3
  - CASR 67.160(7)
  - Table 67.160
  - 3.17 – 3.20

2.7.3 Dipstick Testing

**Haematuria**

Urinary ‘dipstick’ testing is required as part of the routine aeromedical examination to screen for the presence of haematuria. Approximately 2-5% of the population have microscopic haematuria, but only about 0.5% who are under age 70 will have a urinary tract cancer as the cause. A positive dipstick test should be repeated, and if negative, managed expectantly. (Most of these applicants will have a minor glomerular lesion.)

Initial aeromedical management of an applicant with a persistently positive dipstick test involves obtaining phase contrast microscopy of a fresh mid-stream urine sample. The sample must be examined within two hours of being passed; thus individuals more than two hours from a suitable pathology service must travel to a location that has that capability. Because of wide variation between laboratories in reporting urine abnormalities, CASA’s relevant requirement for a ‘normal’ assessment in an applicant found to have microscopic haematuria is for three separate urine tests, all of which have less than 20,000 RBC per ml. Phase contrast microscopy of specimens with crenated cells up to 10,000 per ml, indicating a glomerular origin, are considered to be within normal limits. Cells with a ‘non-glomerular’ appearance are likely to indicate a urothelial problem.

Where there is ‘significant haematuria’ (more than 20,000 RBC per ml in any test), initial urogenital imaging is to be by Ultrasound or Intravenous Pyelogram (IVP), as some 10% of all stones are radiolucent. The requirement for further investigation should be determined on clinical grounds and on the basis of investigation results.
Proteinuria

Orthostatic proteinuria can be excluded by testing an early morning urine specimen. If an early morning specimen remains positive for protein, then a 24-hour urine protein estimation is required. Normal is <150mg protein/day.

2.7.4 Urinary Calculi

There have been no reported episodes of incapacitation involving CASA certificate holders with a known history of renal calculi. However, there have been several untoward incidents as a result of undiagnosed or unreported stone. The aviation environment may predispose aircrew to stone formation due to the low humidity environment often found in aircraft cockpits, and because of a tendency for some pilots deliberately to under-hydrate to avoid the need to urinate, particularly where there is no toilet on the aircraft.

The presence of any stone or stones in the urinary system is aeromedically significant. (For CASA certification purposes, there is no such entity as an asymptomatic stone). Renal stones as small as 1-2 mm diameter can and do cause significant symptoms. There are no reliable prognostic indicators that can determine if a stone will or will not cause symptoms, and the chance of a stone present for 10 years moving in the subsequent 24 hours is the same as it moving after being present for 10 days. The time a stone has been present is not a reliable indicator of risk.

Single Renal Stone (Passed or Removed)

In applicants who have had a single episode of renal colic, about 50% will have a repeat episode within 5-7 years, and nearly 100% within 12-15 years, unless they modify their behaviour. However, for applicants who have passed all stones or had them removed and who are able to maintain adequate urine flow (>2 litres/day), the risk of stone recurrence is the same as for the general population. Thus CASA will certificate pilots and ATCs who have experienced a single episode of renal stone disease, with successful removal or passage of the stone. In such cases, the only surveillance need be by urine dipstick at routine CASA medical examinations.

Recurrent Renal Stones (Passed or Removed)

Pilots and ATCs who have experienced recurrent episodes of renal stone disease may be recertificated once they are proven to be free of all stones in the kidney or renal tract, have normal renal function and have adopted appropriate risk minimisation behaviour. CASA will require the following annual investigations and reports in these cases:

- Plain abdominal X-ray or ultrasound
- 24-hour urine calcium and urate estimations
- Urological review.
Retained Renal Stones

Where stone material remains in the renal substance or urinary tract, CASA will not permit unrestricted Class 1 or Class 3 certification unless there are clear mitigating factors that preclude renal colic, such as a staghorn calculus, a calculus in a diverticulum, or a stone clearly embedded in the renal substance. (Further stone movement is extremely unlikely in such cases.) Pilots or ATCs with staghorn calculi many be suitable for certification, on a case-by-case basis, until stone removal, provided they are asymptomatic, their renal function is normal, and movement of the calculus is considered unlikely. CASA may entertain unrestricted certification for Class 2 applicants in similar circumstances, on a case-by-case basis, and subject to annual urological review.

Approximately 20% of patients will have residual calculi three months after undergoing Extracorporeal Shockwave Lithotripsy (ESWL). Where there is a small stone or remnant following attempted removal with ESWL, generally accepted management is to leave the stone alone. However, due to the risk of inflight incapacitation with residual stone fragment movement, it may be worthwhile to offer removal of stone remnants via flexible ureteroscopy. There is currently an approximate 50% success with this procedure, but its risks include urine extravasation, which can be extremely painful. Percutaneous nephrolithotomy (PCNL) may be a better option for pilots to ensure a stone free status.

2.7.5 Medullary Sponge Kidney

Persons with medullary sponge kidneys (MSK) tend to be chronic renal stone formers. Therefore, most applicants for pilot or ATC certification who have MSK will not be issued an aviation medical certificate of any kind. However, CASA may certificate pilots or ATCs with this condition, on a case-by-case basis, if they have a history of one episode of renal colic or fewer, and if there are no residual stones demonstrated on investigation. (Beware of the applicant with only a radiological diagnosis of MSK and no history of stones or calcification. Many such persons have only a prominent medullary blush with no adverse implications for aeromedical certification.)
2.7.6 Glomerulonephritis

**Thin Membrane Disease**

Thin membrane disease (TMB) is due to a type IV collagen genetic defect and occurs predominantly in females. It has no major health implications and is considered benign for the purpose of CASA aeromedical certification. Patients with TMB often have an incidental finding of 80,000-100,000 RBC per ml of urine, but further investigation reveals no other abnormalities. If blood pressure is normal and renal function tests are normal (including 24-hour urinary protein excretion and 24-hour creatinine clearance), CASA will accept a presumptive diagnosis of TMB and will not require further investigation. While biopsy may be offered to confirm the diagnosis of TMB, such an investigation is not required for aeromedical certification.

Where TMB is confirmed by biopsy, there is no requirement for any surveillance. In the case of a presumptive diagnosis, the result of a serum creatinine study is required with every subsequent CASA medical examination.

**IgA Nephropathy**

This condition was formerly considered to be benign, but it is now clear that it may later lead to renal failure in some persons. Risk of disease progression is greater when it is associated with hypertension, abnormal renal function test results and renal scarring, detected on biopsy. In the absence of such abnormalities, the risk of renal failure in cases of IgA nephropathy is about 1% after 20 years. The condition is of aeromedical concern because of the risk associated with subtle incapacitation due to circulating toxins produced as renal failure progresses. Rapid progression to nephrotic syndrome may also occur. CASA will usually certificate pilots and ATCs who are affected by IgA nephropathy. Required surveillance measures are:

- 24-hour urine protein estimations
- Serum albumin testing
- Renal function testing.

All of these tests are to be done at six-monthly intervals.
2.7 Nephrology and Urology

2.7.7 Nephrotic Syndrome

Many persons affected by this condition recover spontaneously, while others respond well to treatment with steroids. If immunosuppression is necessary for treatment, pilots and ATCs may not exercise the privileges of their licences until treatment is complete. CASA will consider recertification once the condition has resolved, medication has been ceased and renal function has returned to an acceptable level (defined as protein excretion <3g per day).

2.7.8 Renal Failure

For aeromedical certification purposes, renal failure is defined by biochemical markers of impaired renal function. Physical symptoms of renal failure occur late in this disease and represent manifestations of severe end stage renal failure.

The main marker of renal function is the serum creatinine level. Most persons with chronic renal impairment who have a creatinine level <200 micromol/L suffer no untoward effects. (However, DAMEs should recall that a creatinine level <200 micromol/L may evoke severe symptoms in cases of acute renal impairment). Where an applicant’s creatinine level is between 200 and 500 micromol/L, the DAME’s clinical acumen will be required to determine fitness for exercise of licence privileges. A creatinine above 500 micromol/L invariably produces untoward health effects, including:

- Slowed mentation
- Poor concentration
- Lethargy
- Gastrointestinal disturbance
- Other electrolyte disturbances
- Rapid deterioration with intercurrent illness.
Aeromedical Disposition

When there are three test results of >500 micromol/L creatinine, the DAME should advise the applicant not to exercise the privileges of his/her licence and inform CASA of the details. Following a single initial test result of >500 micromol/L creatinine, the certificate holder should be advised not to exercise privileges, and a further test arranged for 48 hours later. If the second test confirms the original result, a third test is required 48 hours later again. The DAME should inform CASA Aviation Medicine Section of the results, and CASA will usually suspend the applicant’s medical certificate. For reported creatinine levels between 200-500 micromol/L, the DAME will consider the possible effect on safe aviation of symptoms such as those listed above, and either advise the applicant accordingly or discuss the matter with CASA Aviation Medicine Section.

Acute renal impairment is usually associated with a significant insult which itself precludes a medical certificate holder from flying or controlling. Once recovered from the precipitating cause of acute renal failure, CASA will consider recertification on a case-by-case basis.

Renal Dialysis

Persons undergoing renal dialysis usually have significantly high creatinine levels, even soon after completing a dialysis session. Their electrolyte levels may be abnormal because of large fluid shifts that accompany dialysis. Consequently, persons undergoing renal dialysis may remain symptomatic for several hours following dialysis. CASA will not usually certificate pilots or ATCs with chronic renal failure who are undergoing dialysis (of any type). Very well controlled pilots and ATCs may be granted special certification, on a case-by-case basis, permitting exercise of privileges in the period between 12 and 36 hours (only) following a dialysis.

Renal Transplant

Following renal transplantation, most recipients receive immunosuppressants to prevent tissue rejection. They have increased risks of hypertension and of ischaemic heart disease, also of developing carcinoma. Some transplant recipients have minimal complications and normal renal function. CASA will not consider aeromedical certification for pilots or ATCs until 12 months following transplantation. If the applicant is then receiving standard immunosuppressant therapy, has well controlled blood pressure, and renal function is at an acceptable level, CASA, may consider recertification, on a case-by-case basis.
2.7.9 Single Kidney

If an applicant has a single kidney and this condition is developmental, renal function testing should be undertaken. If this is normal, aeromedical certification will be unaffected. If an applicant has a single kidney due to nephrectomy, the cause of the kidney’s removal must also be considered. If the underlying cause does not affect certification, then the same considerations of renal function testing and aeromedical disposition apply as for developmental variations.

2.7.10 Urinary Tract Infections

Female

In the young adult female, isolated urinary tract infection (UTI) is common. Investigation rarely reveals a specific cause. A small percentage of women will develop chronic or recurrent UTIs. They require investigation (including IVP) to exclude underlying anatomical causes. Some of them may need antibiotic cover for extended periods and/or post coital antibiotic prophylaxis. Female applicants receiving antibiotic treatment for recurrent UTIs are unlikely to adversely affect the safety of air navigation, and there need be no restrictions on their aeromedical certification.

Male

A UTI in a male usually indicates the presence of an anatomical abnormality in the urinary tract. The diagnostic yield from investigations is about 50%. Adequate investigation must include IVP and cystoscopy. Future aeromedical certification will depend on the findings from investigations.

2.7.11 Prostatitis

Acute bacterial prostatitis should be managed as an acute intercurrent illness (like UTI) and the pilot or ATC returned to duty only when fully recovered. Non-bacterial or chronic prostatitis is considered to be a form of pelvic pain syndrome, often accompanied by significant psychological overlay, analogous to the findings in Irritable Bowel Syndrome. Chronic prostatitis is often distracting and may be difficult to manage. Best pharmacological management is with anti-inflammatory and/or anti-depressant medications. CASA will determine future aeromedical certification of affected applicants on a case-by-case basis. The DAME should closely assess the psychological status of any affected pilot or ATC before making a recommendation concerning aeromedical disposition.
2.7.12 Urinary Outflow Obstruction

Benign prostatic hypertrophy (BPH) is the commonest cause of outflow obstruction in Australian males. Acute urine retention occurs in persons affected by BPH at the rate of 5-8% per annum. There is also a small risk of chronic incapacitation due to reduced renal function.

An acute retention episode may be treated by surgery, or by use of an alpha-blocker medication. Successful surgery will usually result in clearance to return to flying or controlling as soon as the applicant has fully recovered from the effects of the surgery. Note that alpha blockers may reduce G-tolerance—the more specific the drug, the better tolerated. Tamsulosin or alfalfusin are highly selective, but are seldom prescribed in Australia as they are not currently listed on the PBS. Prazosin is listed on the PBS, but is less selective than other available agents and has more side effects. Prazosin use is not compatible with agricultural or aerobatic flying, and medical certification for pilot applicants using it will contain appropriate restrictions.

2.7.13 Testicular Cancers

Also see Section 2.14, Malignancy.

Teratoma

The progress or recurrence of teratomas may be determined by use of an appropriate marker. Chemotherapy is the usual treatment and there is >90% cure rate. When the applicant has a stage A tumour and markers are normal, early return to duty may be possible. For stage B tumours, where adequate treatment requires 3-4 cycles of chemotherapy, return to duty will be delayed until at least three months after completion of chemotherapy. All such cases should be referred to CASA Aviation Medicine Section for determination of aeromedical disposition.

Seminoma

Seminomas are very sensitive to radiation, and a very low radiation dose may be curative. As there is no reliable marker available at present, surveillance can be difficult. Once treatment is complete, early return to duty may be possible. All such cases should be referred to CASA Aviation Medicine Section for determination of aeromedical disposition.
2.7.14 Prostatic Carcinoma

Prostate Specific Antigen (PSA) is a very reliable marker for progress of established prostatic cancer. However, it is unreliable as a screening test and there is still no normal range defined for it. Risk of prostate cancer against PSA may be graphed, and most laboratories recommend further investigation when a PSA is >4, but positive predictive value is poor at this level. Once PSA reaches 12, the PPV is close to 1.

In established disease, the PSA is a proxy measure of prostate bulk and of cell turnover. PSA levels >50 are associated with a significant risk of pathological fractures, cerebral and other metastases. However, applicants with prostate cancer and a PSA of <30 have a positive bone scan in <1% of cases. An applicant with PSA of <20 will have cancer mass of only a few grams, while a PSA <12 is not associated with significant risk of metastases.

Aeromedical Certification

Post-radical prostatectomy, if the operation has been successful, PSA should fall to undetectable level. If the level remains undetectable at three years post surgery, there is <5% chance of recurrence of disease. In such circumstances, applicants can be considered cured after four years. Radiotherapy now produces similar outcomes and if PSA remains at nadir levels for 3-4 years following radiotherapy, a similar assessment may be made. Usually, certification for all classes of medical certificate may be possible 3-4 months post surgery or after completion of radiotherapy. CASA will require annual follow up urological reports and PSA estimations. However, if the PSA remains undetectable five years after surgery, no further reports will be required.

Pilots and ATCs with advanced prostatic cancer and PSA >30 must also undergo bone scan as part of their required investigations. CASA will usually only contemplate certification for this group on the basis of ‘as-or-with co-pilot’ or ‘as-or-with second controller only’.

Treatment with anti-androgen therapy produces significant side effects in about 10-20% of cases, particularly lethargy. LHRH agonists may rarely cause a chronic confusional state. Prior to return to duties, an applicant receiving anti-androgen therapy will require an operational check. (Also see Section 2.13, Medication – Drugs and Flying / Controlling.)
2.7.15 Renal Cell Carcinoma

Cerebral spread from a renal cell carcinoma is highly likely. Previously, this cancer has usually been detected late, and affected persons have had poor survival rates. However, recently these tumours have often been detected incidentally by ultrasound. 80% of these tumours are now <5cm in diameter when found, and five-year survival in those affected persons is >90% following treatment. Even for larger tumours (<10cm), five-year survival is >70% following treatment.

**Aeromedical certification**

As the outcome of renal cancer is unpredictable, and as cerebral metastases are common, CASA will determine aeromedical disposition of pilots and ATCs with this condition on a case-by-case basis. If granted, initial certification is likely to be ‘as-or-with co-pilot’ or ‘as-or-with second controller only’. Certification will not be granted until at least six months following completion of treatment. Unrestricted class 1 certification will not be considered until at least three years post treatment. Class 2 applicants will be considered for unrestricted certification after two years, and Class 3 applicants after one year. CASA requires follow up investigations as follows:

- Six-monthly CT scans for Class 1 applicants
- Annual CT scans for class 2 and 3 applicants.

In all cases, additional investigations must include Full Blood Examination (to exclude polycythaemia), Liver Function Tests, and Urea and Electrolyte estimations.

After 10 years without recurrence of tumour following treatment, an applicant may be deemed ‘cured’. Thereafter, no additional surveillance measures will be required.
2.7.16 Polycystic Kidneys

Polycystic kidneys (PCK) may be associated with several complications that could adversely affect the safety of air navigation. These include acute pyelonephritis, haemorrhage into cysts, renal stones, berry aneurysms and cardiac valvular disease. However, most persons with polycystic kidneys do not experience these complications. The commonest side effect of the condition is hypertension, usually readily controlled by medication. Due to the statistical association of polycystic kidneys with berry aneurysm, all applicants with known PCK must provide the result of a recent Magnetic Resonance Angiogram (performed within 12 months). If this is normal, CASA will usually approve medical certification. However, the test must be repeated and results provided to CASA at intervals of five years while medical certification is maintained. If the DAME detects any cardiac murmur when examining an applicant with PCK, CASA requires an echocardiogram and report for initial certification. This is also the case when any new murmur is noted.

2.7.17 Amyloid

This is a systemic disease with possible renal, neuropathic and cardiological manifestations. On diagnosis of the condition, inform CASA Aviation Medicine Section and advise the applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA. Following appropriate investigations, CASA will determine aeromedical disposition on a case-by-case basis.
2.8.1 Gynaecological and Obstetric Standard – CASR Part 67

The gynaecological and obstetric standards are found in the following paragraphs of CASR Part 67:

- CASR 67.150 For medical standard 1
  -CASR 67.150(7)
  - Table 67.150
  - 1.23 – 1.24

- CASR 67.155 For medical standard 2
  -CASR 67.155(7)
  - Table 67.155
  - 2.22 – 2.23

- CASR 67.160 For medical standard 3
  -CASR 67.160(7)
  - Table 67.160
  - 3.21 – 3.22

2.8.2 Severe Menstrual Disturbances

Applicants with a history of severe menstrual disturbances resistant to treatment must be assessed with caution. Such applicants are likely to be unacceptable for issue of a Class 1 or Class 3 Medical Certificate.

2.8.3 Pregnancy

Pregnancy, particularly during the final trimester, is a cause of temporary unfitness to exercise the privileges of all aviation licences. However, where the obstetrician or other medical practitioner supervising the pregnancy certifies that an applicant or medical certificate holder has no significant medical contraindications related to the pregnancy, she may be assessed as meeting the appropriate medical standard(s). The exercise of licence privileges in such circumstances may involve imposition of appropriate, individually determined operational restrictions.

The risk of acute incapacitation from premature labour exceeds 1% after 30 weeks gestation. Consequently, all medical certificate holders are advised not to exercise licence privileges after 30 weeks gestation.

Class 1 and 2 medical certificate holders are formally deemed medically unfit to exercise licence privileges from 30 weeks gestation until cleared by a post-partum assessment conducted in accordance with the last paragraph in this section.
Class 3 medical certificate holders may exercise relevant licence privileges until 34 weeks gestation provided that:

i. The obstetrician or other medical practitioner supervising the pregnancy certifies that the licence holder is fit for duties during this period; and

ii. Suitable administrative arrangements are made which ensure that sudden incapacitation of an affected licence holder due to premature labour will not adversely affect the safety of air navigation.

Thereafter, Class 3 medical certificate holders also are formally deemed medically unfit to exercise licence privileges until cleared by a post-partum assessment conducted in accordance with the following paragraph.

Following delivery, applicants are required to obtain a clearance from a DAME before once again exercising the privileges of an aviation licence. Depending on the stage of a pregnancy at which the event occurs, such clearance may also be required following a miscarriage, stillbirth or termination of pregnancy. Pregnancy is considered a medically significant condition and DAMEs should remind pregnant applicants of their obligations under CASRs to refrain from exercising their licence privileges until medically cleared. (See also 1.4.5 Temporary Incapacity of Certificate Holders.) Following a normal delivery, clearance to resume flying duties should be appropriate at six weeks post-partum.
2.9 Gastroenterology

2.9.1 Introduction

There is a very wide range of conditions of the gastrointestinal tract and associated organs that may have aviation safety implications. The greater majority are compatible with certification after appropriate assessment and management. This section provides guidance on common conditions of the gastrointestinal tract, liver and pancreas that may be presented to a DAME. It does not cover GI malignancy. All malignancy related advice is addressed in the Section 2.14 Malignancy of this handbook.

2.9.2 Alimentary System Standard – CASR Part 67

CASR 67.150 For medical standard 1 CASR 67.150(7), Table 67.150 1.14
CASR 67.155 For medical standard 2 CASR 67.155(7), Table 67.155 2.13
CASR 67.160 For medical standard 3 CASR 67.160(7), Table 67.160 3.13

2.9.3 Gastro-Oesophageal Reflux Disease (GORD)

GORD is a very common condition. GORD and Irritable Bowel Syndrome are the two most common GI diagnoses in the Australian pilot population. Underlying pathology that is severe or progressive is unlikely. However, the possibility of cardiological cause of the symptoms should always be borne in mind, particularly where there is resistance to treatment. Where there is chest pain with uncertain aetiology, it is imperative to exclude a cardiac cause before moving to GI or other systems.

Around 50% of all patients diagnosed with GORD have no findings on endoscopy. This is often described as nervous or non-ulcer dyspepsia (NUD) but in reality this is endoscopy negative symptomatic gastro-oesophageal reflux that might be revealed by other techniques, such as oesophageal pH monitoring. NUD refers to symptoms that occur in a group of people without endoscopic or physiological evidence of an acid-peptic complaint. These people usually have a limited or zero response to acid suppressing medication.
Treatment can commence based on symptoms and endoscopy conducted, when response to treatment is poor, “alarm” symptoms occur (eg bleeding, dysphagia) or long term treatment appears to be indicated. Medication is generally very successful, especially with the development of Acid/Proton Pump Inhibitors (PPIs). These drugs have a low side effect profile. Bleeding from reflux oesophagitis while on PPIs is very rare. In theory, intense gastric acid suppression by PPIs may increase susceptibility to gastrointestinal infection, as the internal environment of the stomach is less hostile to ingested organisms. Those who have been treated and are symptom free are generally suitable for certification. Where there are persisting symptoms, treatment should continue, with regular reviews. High-risk ‘alarm’ symptoms such as dysphagia indicate endoscopy. After short term treatment symptoms may return, sometimes with a rebound effect after stopping a PPI. Ongoing treatment may be indicated. However, ‘on demand’ treatment is becoming more popular. This should not present difficulties with aviation duties.

Selective Serotonin Reuptake Inhibitors (SSRIs) are fairly commonly prescribed along with PPIs for non-ulcer dyspepsia. This is not a risk in itself, but caution is required with the use of SSRIs. Refer to the Section 2.6 Psychiatry in this handbook. Cisapride and SSRIs have a risk of cardiac arrhythmia. Treatment with cisapride is mostly limited to treatment of gastroparesis and therefore cisapride is likely to be withdrawn from the Australian market.

Other medications that may be used include H₂ receptor antagonists. There is some sedation associated with these medications, and a ground trial period is advised. Metaclopramide may on occasions alter the level of consciousness and should not be used for ongoing treatment.

**Barrett’s Oesophagus**

- **Long Segment**: Second-yearly endoscopy will generally be required.
- **Short Segment**: Five-yearly endoscopy will generally be required but current approaches vary.

### 2.9.4 Peptic Ulcer Disease

Management of peptic ulcer disease (PUD) has changed comprehensively following the identification of helicobacter pylori as the most common cause of ulcers. The vast majority of peptic ulcer disease is now known to be due to helicobacter or NSAIDs. Smoking is a further independent risk factor. PUD may be ‘silent’ and not cause symptoms but the risk of a sudden acute bleed in an asymptomatic person is small. “Silent” ulcers are more common and more likely to cause morbidity in those taking NSAIDs including COX-2 inhibitors.
Duodenal PUD

Symptomatic PUD with helicobacter pylori. With the onset of symptoms, the DAME should impose a period of no flying or controlling. In this case, there is a requirement to undertake clearance of the infection prior to return to flying. A negative urea breath test is usually taken to be definitive proof of clearance when performed around two months after treatment. Where the DAME is satisfied that that symptoms have resolved and there will be compliance with the rest of the treatment, there may be a return to flying or controlling. Such return must be on the understanding that evidence of clearance of infection is required within three months of completing treatment. Definitive proof of clearance is usually currently obtained by a urea breath test around two months after treatment. A period of at least seven days off PPIs is necessary prior to the test. Should the infection still be present, the risk of recurrence of symptoms is high (around 80% in the first year). Failed eradication usually indicates the need for further treatment. Without eradication after the follow up test, further treatment is required. Where this second attempt at clearance is unsuccessful, the pilot or controller will usually be grounded until eradication is proven. Where there is symptomatic duodenal PUD only without complication, there is no requirement for a second endoscopy to prove ulcer healing. Once eradication has occurred, the lifetime risk of recurrence is only around 3 to 5%.

Symptomatic PUD without helicobacter pylori. The cause of the PUD needs to be identified and corrected. This is most commonly NSAIDs. The usual treatment for the ulcer in this case is a PPI for around six to eight weeks.

Complicated duodenal PUD. Where there are complications of PUD such as bleeding or perforation the pilot should be grounded during treatment. Endoscopic proof of ulcer healing will usually be required prior to clearance to return to flying or controlling. Approximately 80% of all ulcers are healed after one month. Therefore, the second endoscopy is best scheduled for around this time. Furthermore, when helicobacter infection has been detected and treated, proof of clearance will be required either by a urea breath test or endoscopic gastric biopsies for rapid urea testing (eg CLO/HUT tests) or histology.

Chronic duodenal ulcer without eradication of Helicobacter pylori. Consideration will be given to certification of pilots or controllers who have not eradicated Helicobacter pylori, either due to not undertaking eradication or failure of the eradication. Applicants must be on long-term maintenance therapy with a proton pump inhibitor and without symptoms.

Gastric Ulcer

Gastric ulcers should be treated in a similar way to complicated duodenal ulcers. A second endoscopy, usually at one month after beginning treatment, is required to demonstrate healing of the ulcer prior to consideration of return to flying. The underlying cause of the ulceration needs to be identified and corrected wherever possible.
2.9.5 Hepatitis

**Acute**

Acute hepatitis may be due to a number of causes, predominantly infectious but may also be toxic or immunological. The individual is usually too sick to function adequately and is not physically able to fly. The enterically mediated causes, mainly Hepatitis A and E, and other causes such as CMV and EBV generally result in a full recovery. Initial work up should include routine blood tests, LFTs, FBE, infectious hepatitis serology, and an upper abdominal ultrasound. Return to flying is based on evidence of clinical recovery. Some episodes of hepatitis are followed by a prolonged phase when the patient remains jaundiced but otherwise recovers. No further investigation is recommended until six months after presentation, unless the episode is fulminant. In this case, patients may progress from walking to moribund in 24 to 48 hours, but thankfully this extremely fulminant presentation is rare.

**Chronic**

The main causes of chronic hepatitis of aeromedical concern are Hepatitis B and Hepatitis C. These may be slowly progressive and may lead to cirrhosis and hepatic decompensation. There is unlikely to be an acute presentation, unless unexpected decompensation occurs secondary to portal hypertension causing haematemesis or ascites with infection.

Transmission of infection is not an issue in civilian aviation. The presence of Hepatitis D in particular should raise the prospect of intravenous drug use.

**Treatment for Hepatitis C.** Current treatment protocol for progressive Hepatitis C infection is combined Interferon and Ribavirin. Both of these medications have significant aeromedical issues, with interferon occasionally causing neuropsychiatric symptoms, which may occur intermittently and unpredictably throughout treatment. Most people also experience significant malaise. Ribavirin produces a significant anaemia in many patients. Thus, there should be no flying or controlling during the course of treatment. There may be consideration of return to duties once off medication and any anaemia has resolved.

**Progressive hepatitis** There is no one measure of the progression of chronic hepatitis and cirrhosis. Bilirubin, albumin and prothrombin time/INR are the best independent laboratory measures. These should be considered together with the presence of ascites and encephalopathy. Each case needs to be individually assessed, particularly for the presence of portal hypertension and hepatic encephalopathy, including minimal (stage 1) hepatic encephalopathy (MHE). While there is no overt deterioration in cognitive or affective functioning, there will not be a restriction on flying, but increased surveillance will be necessary.

Abnormal LFTs that have been noted for greater than 12 months indicates the potential for chronic liver disease and cirrhosis.
**Liver biopsy.** A liver biopsy provides very useful diagnostic and prognostic information but can cause serious complications such as intra-abdominal haemorrhage. The decision to recommend biopsy will usually be delayed for at least six months after presentation depending on the degree to which liver enzymes and function are abnormal. Many patients with abnormal liver enzymes, even over a long period, will not have an absolute indication for liver biopsy. The timing of liver biopsy, if necessary, can be based on clinical progression and the level of concern expressed by the patient regarding diagnosis and prognosis.

### 2.9.6 Abnormal Liver Function Tests

Liver function tests are frequently found to be abnormal, with small elevations in one or two liver enzyme parameters. Given that the normal range by definition comprises two standard deviations from the mean, some 5% of all truly normal results will be classified as being abnormal—that is, falsely abnormal results. Where there is a real abnormality, the most common causes are Gilbert’s Syndrome (slightly raised unconjugated bilirubin, most common manifestation), non-alcoholic fatty liver disease (NAFLD), and minor alcohol effects.

In the absence of other clinical clues, slightly abnormal LFTs are best repeated after around one month. If they remain elevated, then the following is recommended:

1. **Assessment of alcohol intake.**
2. **Family history of liver disease.**
3. **Blood Tests:** Hepatitis B & C; Iron studies including ferritin; Copper studies; $\alpha_1$ antitrypsin; hepatic autoantibodies.
4. **Upper abdominal ultrasound.**

Definitive diagnosis of a fatty liver can only be achieved by liver biopsy, but it is usually diagnosed based on clinical picture only. Alcoholic disease and diabetes mellitus should be included in the differential diagnosis. Ultrasound is moderately reliable for fatty liver, with increased echogenicity/altered hepatic texture most likely to be due to fat. However, fibrosis or cirrhosis could also be present and difficult to detect.

There should be regular reviews of aircrew with continuing abnormal LFTs. Where transaminase is $<100$, repeat testing should be every six to 12 months. If the transaminase is above 100, testing should be every three to six months.
2.9.7 **Alcoholic Liver Disease**

This section will not discuss alcohol related illness. Rather, there will be a discussion of the effects of alcohol on the GI system.

There are no definitive tests that can demonstrate clearly that alcohol is the cause of liver disease. In the end it comes down to honest reporting. Blood tests can help; MCV, $\gamma$GT and AST>ALT are suggestive. Liver biopsy is not definitive as many other causes can produce similar findings. Carbohydrate deficient transferrin is becoming used, but it remains largely a research tool. It can be useful as a confirmation, and to monitor progress within that individual.

Relapsing hepatic decompensation, gastritis, neurological signs, including cerebellar signs are all useful as part of a broader picture in advanced cases of alcoholic liver disease when cognitive and physical incapacity are present. DUI convictions may also be indicative.

Screening tests have not been found to be particularly valuable. The AUDIT is probably the most widely used. The tests are aimed at the severe end of the alcoholic spectrum. In practice, concern should be raised where the drinking exceeds the NH&MRC recommended limits of four standards drinks per day for men and two standard drinks per day for women.

Approximately 1:5 people who drink excessively will have liver abnormalities. It is the most reversible form of liver disease in the early stages. Stopping drinking will usually reverse abnormalities within around six months. The alcoholism is more important than the alcoholic liver disease, and the focus should be put on the alcoholism. Until there is a secondary effect from liver damage, there should be no impact on flying from the liver disease. The impact on flying will be from the alcoholism.

2.9.8 **Gallstones And Gall Bladder Diseases**

**Asymptomatic gallstones (chance finding).** It appears that the risk of cholecystitis in the presence of asymptomatic gallstones, where there has never been symptoms, is low, and almost certainly is below 1% per annum, although there is little data to work from. Gallstones ranging from a single large stone to multiple small stones may be detected by ultrasound. There is a slightly increased risk of biliary colic, pancreatitis and other hepatobiliary symptoms with small gallstones but the outcome of expectant versus prophylactic cholecystectomy is no different. There will generally be no change to flying status unless gallstones become symptomatic. In those who are asymptomatic there is no requirement to remove the gall bladder for fitness to fly.

**Acute cholecystitis.** Generally the pilot will be too sick to fly.
2.9 Gastroenterology

Following single episode of cholecystitis. Often after a single episode, patients are treated expectantly and wait to see if another episode occurs. However, the risk of a further episode is around 5% per annum. Therefore, it would be expected that there is no return to flying until the gall bladder is removed. There may be the option of multi-crew certification for Class 1 or 2, or no solo controlling for Class 3 pending definitive resolution.

Stones in bile duct. The presence of stones in the bile duct is not compatible with flying or controlling. There is a significant risk of ascending cholangitis or pancreatitis, and the stones must thus be removed prior to returning to any duties.

2.9.9 Haemochromatosis

Haemochromatosis is a genetic disease that is often found incidentally, mainly through liver function testing or iron studies. The presence of the relevant genes in the Australian population is around 1:200. Around 50% of these will develop significant iron loading but not all genetically affected individuals develop liver or other organ injury (ie, phenotypic variation in disease expression). Organ injury depends on the severity of iron loading and co-factors such as significant alcohol consumption or other co-existent causes of liver injury. Should iron loading be prevented (usually by early detection and venesection treatment) then permanent liver injury (fibrosis/cirrhosis) usually does not occur. The best measure of iron stores in this context is serum ferritin.

Screening is possible, but to date has not been recommended in the Australian population. This may be by transferrin saturation, or by HFE genetic testing. There is no requirement to screen for haemochromatosis in the aviation context unless there is a family history of the disease.

Late diagnosis can be a problem, with progression to cirrhosis, pancreatic injury (diabetes mellitus), heart (arrhythmias, heart failure) and pituitary involvement. Males usually present in the 5th decade, females in the 6th decade due to their generally lower rate of iron load. If, at age 40 years the ferritin level is less than 1000 ugm/l and LFTs are normal, the risk of permanent liver damage is negligible. Cardiac assessment should include the presence of conduction defects and cardiomyopathy.

Treatment is via regular phlebotomies/venesection. Pilots and controllers should not exercise the privileges of their certificates for 24 hours after each venesection due to possible cardiovascular instability.
2.9.10 Pancreatitis

Pancreatitis is sometimes diagnosed in the setting of a small increase in serum lipase. However, for the diagnosis to be made there should be a significant increase in lipase together with acute abdominal pain.

The main risk factors are

- **Gall stones.** If gallstones are found, where there are no other risk factors, the gall bladder should be removed.
- **Alcohol.** This usually produces a relapsing picture.
- Hypercalcaemia.
- Hyperlipidaemia.

Where there is no obvious cause, there may be abnormalities in anatomy. Assessment is usually by MRCP first, followed by ERCP.

Risk of recurrent attacks is highly individual. Idiopathic pancreatitis may be expected to have one to two attacks per year.

**Single episode.** Following a single episode, where there are no ongoing symptoms and any predisposing factors have been addressed, the individual will usually be able to return to flying.

**Recurring pancreatitis.** While symptomatic the individual is very unwell, usually requiring narcotic analgesia. Recurrent pancreatitis is generally not compatible with continued flying or controlling.

**Chronic pancreatitis.** Generally the individual is too sick or has too much ongoing abdominal pain to contemplate flying. A CT scan can be performed to look for the presence of a pseudocyst or abscess. It is unlikely that anyone suffering from chronic pancreatitis will be fit for flying or controlling duties.

There is an association with the development of diabetes; a fasting blood sugar should be obtained as part of the workup.
2.9.11 Coeliac Disease

Coeliac disease can produce severe symptoms of bloating, diarrhoea, abdominal pain and anaemia, but mostly symptoms are mild and presentation is now usually in mid-life. Treatment with a gluten-free diet is usually effective, and should not be an aviation safety issue. People non-compliant with dietary modifications will continue to be symptomatic and some patients will exhibit refractory disease; these cases should be considered on their merits.

Coeliac disease should be thought of as a potential marker for other immunologically mediated diseases, such as type 1 diabetes mellitus and thyroid disease.

2.9.12 Irritable Bowel Syndrome

Irritable bowel syndrome is a very common diagnosis in the Australian pilot population. Some 20% of adult females and 10% of adult males have some symptoms consistent with this diagnosis. Most common symptoms are of abdominal pain, bloating, diarrhoea and constipation. It is unusual to get acute, severe symptoms.

There is a high co-morbidity with obsessive and depressive illness and SSRIs are often used.

Most people can be managed without drugs, using diet.

Diarrhoeal symptoms may be treated with loperamide. This drug does not usually have any central nervous system side effects. Diphenoxylate should not be the first drug of choice for aircrew or controllers, due to its potential neuropsychological effects. If it is necessary, this should be discussed with Aviation Medicine Section doctors.

Colicky abdominal pain and more general abdominal discomfort can be treated with anticholinergics such as donnatabs or mebeverine. Bloating will tend to persist despite treatment. Caution is required regarding anticholinergic side effects, particularly to vision.

Constipation can be treated with high fibre and simple laxatives, with osmotic laxatives such as magnesium sulphate or lactulose preferred in the longer term.

For refractory symptoms, tricyclic antidepressants are the most effective. Tricyclic antidepressants have significant potential aeromedically adverse effects. Refer to Section 2.6 Psychiatry for further guidance.

Most applicants will be fit to hold a certificate. Surveillance may be required annually in the more severe cases.
2.9.13 Inflammatory Bowel Disease

It is often assumed that Ulcerative Colitis and Crohn’s disease are versions of the same disease or are even interchangeable. However, they do have differing natural histories, with Crohn’s disease tending to be worse, with relapse being the rule.

It should be assumed from the outset that Inflammatory Bowel Disease (IBD) will impinge on certification. However, most sufferers are able to obtain certification with regular surveillance.

High-dose systemic steroids should not be used while flying due to the risk of neuropsychological side effects.

If the disease is unstable the person should be grounded, due to diarrhoea, pain and poor nutrition. Stabilisation is usually over several months during treatment with aminosalicylate drugs (e.g., sulphasalazine, mesalazine, olsalazine) and either systemic or rectal corticosteroid treatment. Immunomodulatory medication (such as azathioprine or 6-mercaptopurine) is used to prevent disease relapse in more severe cases. There is a higher risk of skin cancer on azathioprine. Methotrexate can damage the liver.

Flare-ups tend to occur in a subacute manner, with warning often over several days. Acute incapacitation is unlikely, unless there is a clear pattern of such already established. Fitness to fly during flare-ups should be handled as a transient event with clearance to return to flight duties according to CASR 67.265.

Ulcerative Colitis

Ulcerative Colitis may be severe, but is often a relatively mild disease. This is especially so of treated ulcerative colitis of the rectum and sigmoid. The disease may ‘burn out’ in the 50s. With proctitis alone, risk of cancer is no different to the general population.

Crohn’s Disease

Almost all Crohn’s sufferers receive surgery at some stage. Systemic symptoms are more common with febrile disease and acute abdomen amongst the more common manifestations.

For mild disease, Full Blood Examination, C-reactive Protein, Liver function tests and rectosigmoid examination should be carried out annually. LFT should be more often if taking methotrexate.

When there has been pancolitis, regular annual or biennial colonoscopy will improve early detection of colorectal neoplasia beginning eight to ten years after initial diagnosis of colitis.
2.9.14 Chronic Diarrhoea

There are many potential causes of chronic diarrhoea. Most commonly there is irritable bowel syndrome. However, it is important to rule out an infective cause. Medications may also be a cause, such as weight loss treatments including xenical.

In general, diagnosis should be by exclusion of treatable GI disorders, and then treated as for IBS.

2.9.15 Diverticulitis

Diverticulosis of itself is not an issue for aviation safety. A single episode of diverticulitis is generally not of significant concern. Where there is chronic symptoms or recurrence, it is important to evaluate for risk of further symptoms. Partial colonic resection may be required. Each case will be considered on its merits.

2.9.16 Colonic Polypectomy

Following polypectomy by colonoscopy, there is an approximate risk of 1:300 to 1:500 that a significant colonic bleed from the polypectomy site will occur in the first two weeks. The risk is higher if anti-platelet drugs or anti-coagulants are taken after colonoscopy. During this time, therefore, it is best not to fly, due to the risk to safety and lack of access to care. However, it may be reasonable to consider flying operations other than single pilot operations or no solitary controlling.

2.9.17 Bowel Obstruction

Bowel obstruction will result in severe pain and vomiting. A history of bowel obstruction indicates a high risk of recurrence. A single band or hernia can be repaired and certification is usual after recovery. However, recurrent obstruction is of grave concern for certification. Generally, the more episodes of obstruction, the greater the risk of subsequent episodes. Certification will be on a case-by-case basis, with a surgical opinion as to the cause and likelihood of recurrence.
2.9.18 Stomas

In this section the underlying illness or event leading to creation of an “-ostomy” is not addressed. Stoma bags are generally vented and filtered to avoid any risk of trapping of gas or odours becoming an issue.

**Colostomy**

Generally, patients with a colostomy manage well. Most are due to surgery for colon cancer, and the oncology issues are more important. See section 2.14 Malignancy of this handbook. A total colectomy for functional problems often results in small bowel functional problems.

**Ileostomy**

The major issue with ileostomy is dehydration. Electrolyte disorders are fairly common, with hyponatraemia and bicarbonate loss. Fluid that is usually reabsorbed will be lost through the stoma, and an additional litre of fluid may be required.

The great majority of applicants with a stoma will not be restricted on the basis of the stoma.

2.9.19 Haemorrhoids

Haemorrhoids will occur with a relatively high frequency in the pilot population, due to poor low fibre diet, inadequate seating and dehydration. It is rarely a cause of acute incapacitation.

Rectal bleeding should be investigated to exclude other causes, especially carcinoma, even in the presence of haemorrhoids. Only with the exclusion of other causes should the haemorrhoids be regarded as the cause.

An acute clot in an external haemorrhoid often causes marked discomfort, but should not be sufficient to cause incapacitation.

The presence of haemorrhoids should not in general hold up certification.

2.9.20 Anal Fissure

As for haemorrhoids, the presence of bleeding should result in investigation to exclude other more serious causes. The fissure may be distracting but not to the extent of incapacitation.
2.9.21 Abdominal Hernias

Abdominal hernias are of concern due to the risk of acute intestinal obstruction. Where the hernia is amenable to repair and there is a risk of obstruction, it should be treated. If no treatment is planned, a justification based on likelihood of becoming symptomatic should accompany any application. While waiting for repair, the need to restrict the applicant will depend on clinical circumstances. Where there is a bowel loop in a hernia, restriction is likely.

Hiatus hernias only infrequently require repair. A rolling hiatus hernia is at greater risk of obstruction. Generally symptoms can be managed through the use of proton pump inhibitors or \( \text{H}_2 \) antagonists.

2.9.22 GI Bleeding of Unknown Cause

Where there is an iron deficiency anaemia that has been investigated, and endoscopy and colonoscopy are reported as normal, the source of bleeding is likely to be from the small bowel. Often iron deficiency occurs in those who have had long-term aspirin or NSAID treatment. At present, in the absence of ‘red flags’ (eg, systemic symptoms such as unexplained weight loss, fevers, night sweats, persistent significant change in bowel habit, abdominal pain or symptoms of overt GI bleeding such as malaena) to suggest a serious cause, the patient will not be further investigated, and iron supplements used. If supplements are successful, then a cause will probably never be found.

Where iron supplements are used and anaemia progresses, further investigation is required; this may be enteroscopy using a similar procedure to endoscopy, ‘capsule endoscopy’ and/or CT scan. A thorough work up is mandatory to exclude significant disease.

It should not be necessary to ground pilots except those whose anaemia progresses and haemoglobin drops below 10.

If the Hb recovers, then surveillance should be of regular Hb levels, at least every two months for 6-monthly and subsequent testing depending on progress. Restoration of body iron stores (as documented by a progressively normalising serum ferritin taken during a period when iron supplements have been stopped for at least one week) by treatment with oral iron supplements usually takes three to six months minimum, usually with the Hb having returned to normal at an earlier time.

A presentation of malaena is a very different proposition. A cause will need to be identified as there is a high risk of recurrence and of severe causes. The individual should not fly until the cause has been identified and risk of recurrence quantified.
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2.10 Haematology and Reticulo-endothelial Conditions

2.10.1 Introduction

Applicants with haematological conditions are considered individually depending on the nature of the condition, its cause (if known) and natural history. The overriding concern is that the blood must carry sufficient oxygen to satisfy metabolic requirements during all phases of flight.

2.10.2 Reticulo-endothelial System Standard – CASR Part 067

CASR 67.150 For medical standard 1
Table 67.150
1.17 – 1.18

CASR 67.155 For medical standard 2
Table 67.155
2.16 – 2.17

CASR 67.160 For medical standard 3
Table 67.160
3.16

2.10.3 Anaemia

Applicants whose haemoglobin is less than 100 g/l should be investigated as clinically indicated. Final assessment depends on the results of haematological investigations and response to treatment. Full reports are required.

2.10.4 Polycythaemia

Applicants with higher than normal haemoglobin must be appropriately investigated. In secondary polycythaemia due to lung disease, the lung disease is more important. Applicants with polycythaemia vera, untreated or uncontrolled, will be assessed as failing to meet the standard, but will be reconsidered depending on their response to treatment, and on specialists’ reports.
2.10.5 Acute Leukaemia

Acute leukaemia of any type is disqualifying. Applicants assessed as in remission may be permitted to exercise the privileges of the licence held, depending on specialists’ reports. Full details are required.

2.10.6 Chronic Leukaemia

Chronic leukaemias are assessed individually. A specialist’s report is required in every case, including a statement on prognosis for the next year (re-certification is year by year, if at all). Some chronic leukaemias, e.g. CGL, CLL and other myeloproliferative diseases, are usually associated with an enlarged spleen. There is a consequent risk of splenic infarction and rupture (spontaneous or traumatic) in these applicants.

2.10.7 Lymphomas

Applicants with lymphoma are assessed individually. A lymphoma in remission, especially Hodgkin’s Disease, is usually consistent with a pass assessment for applicants concerned. Annual specialist reports are required in all cases.

2.10.8 Haemoglobinopathy

Applicants with abnormal haemoglobins (HbS) are assessed individually. Full reports to Aviation Medicine Section are required.

2.10.9 Haemophilia

Applicants may be certified at the Class 2 level if the condition is stable. Full reports from the treating physician are required.
2.10.10 Oncology

Assessment of applicants with any diagnosis of malignancy is based upon the following considerations:

- Nature of tumour
- Stage of development/invasion
- Response to therapy
- Likelihood of recurrence in a form likely to be incapacitating, e.g. cerebral metastasis.

In general, applicants who are no longer receiving chemotherapy or radiotherapy, in whom the risk of incapacitation is considered to be low during the period of currency of the Medical Certificate, are given a pass assessment subject to continued medical surveillance.

Also see Section 2.14 Malignancy.

2.10.11 HIV Disease

Applicants who are HIV positive but without clinical disease may be certified at the Class 2 level and receive restricted certification (as or with co-pilot) at the Class 1 level.

Applicants should obtain reports (including CD4 helper cell count) from their treating physicians prior to seeking renewal.

When an applicant develops clinical illness associated with HIV disease, further certification is determined on a case-by-case basis. Full clinical details are required.

2.10.12 Blood Donation

In healthy individuals, the fluid depletion that accompanies donation of one unit of blood is replaced within several hours. Any effects from the loss of haemoglobin should not be significant for normal flying operations.

Active pilots should be discouraged from flying until 24 hours have elapsed following blood donation.
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2.11 Orthopaedics and Rheumatology

2.11.1 Applicable Regulations

CASR 67 With regard to the **Skeletal System** the *CASR Part 67* states as follows:

**CASR Part 67, Table 67.150 criteria for medical standard 1 states:**

1.25 Is not suffering from safety-relevant active disease of the bones, joints, muscles or tendons

1.26 Is not suffering from safety-relevant functional sequelae of medically significant conditions of the bones, joints, muscles or tendons

**CASR Part 67, Table 67.155 criteria for medical standard 2 states:**

2.24 Is not suffering from safety-relevant active disease of the bones, joints, muscles or tendons

2.25 Is not suffering from safety-relevant functional sequelae of medically significant conditions of the bones, joints, muscles or tendons

**CASR Part 67, Table 67.160 criteria for medical standard 3 states:**

3.23 Is not suffering from safety-relevant active disease of the bones, joints, muscles or tendons

3.24 Is not suffering from safety-relevant functional sequelae of medically significant conditions of the bones, joints, muscles or tendons

2.11.2 Pain Management

Pain is a complex issue. Severity of reported pain is poorly correlated with the severity of the underlying condition. It is thus very important to identify the underlying condition and prescribe pain relief accordingly. The following discussion should be considered in conjunction with Chapter 13 of this handbook, dealing with certification issues and medication. Each drug group has an annotation, which places it in the category (A-E) as described Chapter 13.

**Non-steroidal Anti-inflammatory Drugs (NSAIDs) (B)**

In general, these medications (NSAIDs) are suitable for aviation duties, but with surveillance of possible adverse effects, particularly of gastric origin. The underlying condition for which they are prescribed needs to be considered in each case.
Cyclo-oxygenase type 2 (COX-2) inhibitors have been found to have an association with coronary disease and strokes in those already predisposed, through an effect on platelet function. It is generally advisable to cease COX-2 inhibitors unless the applicant has a history of peptic ulcer disease. Celebrex continues to be available and Mobic is now usurping the past popularity of Vioxx.

The older non-steroidal anti-inflammatory drugs, such as Ibuprofen, Feldene and voltaren continue to have a place.

Aspirin is effective as an anti-inflammatory agent, but has a significant risk of GI bleeding.

**Paracetamol (A)**

A maximum of four grams a day applies in the case of an adult, due to liver toxicity. It is not an anti-inflammatory agent, functioning in the main, directly on the brain to modify pain response in orthopaedic and rheumatological applications. Where the pain is purely mechanical, rather than inflammatory, Panadol may be the better option.

**Disease Modifying Anti-Arthritic Drugs (DMARDs)**

DMARDs have an important role in reducing symptoms from the condition for which they are prescribed. Where the pilot is being managed closely to identify any adverse effect early, and where there has been an adequate trial period—usually 4 weeks after commencing the medication —prior to return to flying or controlling, continued certification is usual. The extent of the functional effect from the underlying condition will be of significance in determining fitness for continued certification.

**Salazopyrin (C).** There are often side effects such as indigestion and hepatotoxic reactions, which largely occur in the first three months. Therefore, the individual should be closely monitored during this initial period of medication.

**Gold (C).** This is out of favour at present. It is toxic to bone marrow and can cause nephrotic syndrome.

**Methotrexate (B).** Toxic effects are revealed early. Full blood count and liver function testing is suggested every six to eight weeks.

**D-Penicillamine (C).** There is a range of side effects such as scleroderma, nephrotic syndrome, myasthenia gravis and marrow toxicity. If an individual is on this treatment without side effects for more than six months, it is likely that they will remain without side effects.

**Lufenamid (C).** In the early period there may be diarrhoea and skin rash. FBE, ESR and LFTs are needed regularly.
Cyclosporin, cyclophosphamide (C). Provides serious immune suppression, but with a high risk of side effects. Generally these are only used when the underlying disease is severe and would normally preclude certification anyway.

Biologic Agents, such as ana kina and anti-tumour necrosis factor preparations (B). Side effects do not appear to be severe. The high cost at present tends to limit their use to severe disease.

Narcotics (C)

It should be considered barring treatment using all forms of narcotics for individuals involved in aviation-related duties. In exceptional circumstances, consideration may be given to individuals requiring narcotic analgesia where:

- The condition itself poses no safety risk
- Narcotics have been used for an extended period and it is clear that there is no adverse effect on attention or cognition
- Neuropsychological testing demonstrates that there is no demonstrable decrement in performance
- ATC simulator testing and pilot in-flight testing indicates satisfactory performance
- There is no requirement to use the medication within 12 hours of commencing aviation activities
- There is no evidence of addiction to the analgesic.

Tramadol is gaining considerable popularity. While not an opioid, it does have narcotic effects and may be addictive. It has inconsistent effects and side effects, with neuropsychological side effects and causing serotonin syndrome. Panadeine Forte contains 30mg codeine and is a significant opioid dosage.

Those applicants taking narcotics are, in general, ones who self-select; that is, those experiencing significant side effects from the medication, or with significant problems from the underlying condition. They should not plan to fly. They may feel suitable for duty, but there may well be subtle impairments and self-delusion (ie overconfidence) that the pilot or controller may not identify.

Amitriptyline (C)

This is often prescribed in low doses of 25 to 50mg at night to augment sleep. It is a soporific and has a long half-life. Some people are highly sensitive and there are a number of cross-reactions. Many people will be 'slow to take off' after taking amitriptyline the night before.
Corticosteroids (B)

Corticosteroids are a mainstay of treatment in many rheumatological conditions. They can be administered dermally, orally, by eye drops, intra-articularly, injection into the affected soft tissue and intravenously. Local application, even by intra-articular injection, is generally safe. Systemic symptoms are rare. However, occasional sleeplessness and hypomania is observed. There should be no flying or controlling within 24 hours following a corticosteroid injection.

Oral corticosteroids have a large and diverse range of adverse effects. These include mood change, thinning skin, diabetes mellitus, immune suppression and osteoporosis. These are almost invariably time and dose related. A general cut-off for onset of side effects is greater than 10mg per day for more than six months. If more than 10mg per day is being prescribed, bone density assessment should be obtained every two years.

If taking oral medications such as dexamethasone or betamethasone, there should be a more intensive monitoring program, as there is a high incidence of side effects. It is important to understand why the individual has been placed on these medications rather than prednisone or prednisolone.

2.11.3 Functional Assessment

Range of movement

Neck range of movement (ROM) is the most important assessment for a DAME. Unless the restriction is severe, ‘trick’ movements are usually available to compensate for limited neck movement. Provided the pilot can evacuate himself and his passengers safely and rapidly, there is generally no impediment strictly due to ROM limitation.

In reporting to CASA, the ROM should be given in degrees in the three planes of movement, flexion/extension, lateral flexion and rotation.

Operational Assessment

A specific flight test to evaluate the functional impact of a restriction of movement due to an orthopaedic or rheumatological condition may be required. Each assessment will depend on the pilot, the aircraft type and the normal aviation activity undertaken.

A DAME may recommend directly to the certificate holder/applicant that such an assessment take place, or a recommendation can be forwarded to CASA for aviation medicine section to consider such an assessment. Where the DAME conducts the assessment from a referral, permission should be sought from the pilot for details of the impairment to be included in the referral letter. The letter to the pilot undertaking the assessment should be written in plain English, requesting advice of the functional effects on the certificate holder’s ability to carry out aviation duties. These may include cross control in strong crosswinds, or single engine flight in a twin-engine aircraft, the full and free movement of all flight controls, and ability to see unimpeded in all significant areas.
It is often beneficial to talk to the assessing pilot prior to the assessment to clarify the requirements. A Chief Flying Instructor of a registered flying school can perform the assessment, provided that the individual is prepared to conduct such an assessment. Tests directed to be undertaken by CASA aviation medicine section will usually be performed by an approved testing officer (ATO).

Should the pilot refuse permission for release of relevant medical information, there may be a limited capacity to properly assess the individual, and further testing may be required. The pilot should be made aware of the consequences of the refusal and an attempt made to reach agreement on what information can be imparted.

After commencing narcotic or opioid medication, the ATC or pilot should have a test equivalent to their regular test/training regime. For instance, a private pilot will need to bring forward a biannual flight test, and provide a report of that test as part of the assessment for certification.

### 2.11.4 Specific Conditions

#### Arthritis

**Rheumatoid arthritis (RA)**

RA often has systemic effects. It tends to be erosive, with the destruction of tissue. Joint deformity in the hand and grip weakness is likely to be the most significant issue for aviation. A normochromic normocytic anaemia of chronic disease is common and needs to be monitored. Sufferers can have a fairly normal life, particularly if the activity of the disease is controlled early. As a generalisation, people with Rheumatoid arthritis tend to function at a higher level than the extent and apparent severity of the disease would indicate. Fitness for aviation duties will be assessed on a case-by-case basis.

There may be ophthalmic effects, such as from the use of Plaquenil or steroids. If there are no signs or symptoms of ophthalmic involvement, there is no requirement for routine ophthalmic assessment beyond those stipulated based on age and Class of certificate.

RA should best be monitored for effective management by a rheumatologist rather than GP. An annual report from the specialist will usually be required as part of ongoing certification. Serial plain X-rays, FBE and ESR can follow disease progression and activity. LFTs are usually required to check for side effects of medication.
Osteoarthritis (OA)

There may be primary osteoarthritis, without previous trauma to the joint, or secondary osteoarthritis where there is a predisposing injury. There is usually no inflammation, but Heberden's and Bouchards nodes in the hand do have an inflammatory component. The effects can be divided into functional limitations as a result of reduced range of movement and pain. Simple analgesics and physiotherapy are the mainstay of treatment. Unless there is a significant functional impact, sufferers from osteoarthritis will generally have unrestricted certification. Serial plain X-rays and testing for side effects of medication will be required, again on a case-by-case basis.

Seronegative polyarthritides

This may be rheumatoid arthritis where there is no rheumatoid factor detectable, or those associated with HLA B27. 8% of the Caucasian population are positive for HLA B27, and some 1% to 8% of these develop a seronegative polyarthritis. The most prominent type is Ankylosing Spondylitis (AS), but there is also Reiters syndrome, post-salmonella and post-yersinia infection and psoriatic arthritis.

Ankylosing spondylitis presents as a progressive stiffening of the lower back, with pronounced symptoms after extended inactivity, such as sleep. Physiotherapy modalities, exercise and NSAIDs are the most widely used treatment. It affects males to females in the ratio of 8:1. Sitting for a long time, such as in ultra-long haul sectors, may induce stiffness, but it is generally possible to regularly stand and perform stretches.

Gout

Gout tends to be poorly treated overall. It can be of sudden onset and disabling. There is increased risk from sitting, when dehydrated and post-surgical. Thus, the aviation environment does have significant risk for a gout attack.

Most attacks are in people who are poorly managed and who are not compliant with medication and diet.

More than three attacks a year, particularly where the serum urate is greater than 0.45, and tophaceous gout, where there is the presence of destructive articular disease demonstrating long-standing poor control, carries unacceptable risk of a further attack. Given that the onset can be sudden, within the length of a flight, and can be incapacitating, careful consideration will be given to making the pilot or controller unfit until adequate control is demonstrated. Control would be shown through uric acid levels, compliance with medication such as allopurinol, and avoidance of alcohol and other dietary modifications.
Psoriatic arthritis

This usually presents as mono or oligo arthritis, and affects around 8% of patients with psoriasis. It can be progressive and present similarly to rheumatoid arthritis. It should be considered on a case-by-case basis.

Lupus and Connective Tissue Disorders

There appears to be a reduction in numbers and severity of these conditions in the last 50 years. Systemic Lupus Erythematosus (SLE) is diagnosed mainly through a positive anti-nuclear factor and elevated anti DNA, but requires at least four criteria. DMARDs hydroxychloroquine and steroids are the mainstay of treatment. Multiple organs may be involved, including reticulo-endothelial with anaemia, and kidneys with proteinuria. When stable, SLE should be reviewed by a rheumatologist three-monthly, with certification usually being limited to 12 months. Annual reports will need to address any systemic involvement.

Polymyalgia Rheumatica

This generally presents as an acute illness, with equal sex ratio, and rarely under age 60. There is central joint involvement and night stiffness. It is usually well controlled with corticosteroids, of around 15mg of prednisolone per day. Once on treatment, there is a return to normal function within one month, and a gradual reduction in medication with cessation of medication over a period of around two years.

The condition can be relapsing, with the most serious effects being cranial arteritis, which may result in severe headaches and blindness. Visual loss can be sudden. This is rare once on steroids, and if ESR/CRP results are normal, risk is acceptably small.

All certificate holders should be monitored through three-monthly ophthalmology and rheumatology reviews, and three-monthly ESR tests. Certification is usual, provided the condition is controlled, with six- or 12-monthly validity. The relevant reports will be required for re-certification.

Osteoporosis

This condition is associated with a number of risk factors. These are:

- Chronic ill health
- Cigarette smoking
- Family history
- Systemic steroid use
- Post menopausal women
- Women with non-functioning ovaries.
It is less common in males, but still substantial, especially where testosterone levels drop.

In those with established osteoporosis, bone density estimation should be obtained three-yearly. In the presence of a fracture, bisphosphonates such as fosamax and actonel can assist. Weight-bearing exercise is important for prevention and treatment.

There is little immediate relevance in civilian flying if a fracture does not exist or has not occurred. Any fracture should be treated on its own merits.

**Chronic Fatigue Syndrome (CFS) and Fibromyalgia**

This is a diagnosis of exclusion as there is no specific diagnostic test. No pathology has ever been demonstrated to be the cause. It is widely assumed that a psychological disturbance underlies the presentation in most if not all sufferers. Symptoms are diverse, including sleep disturbance, trigger points, and depression. While fatigue is prominent, there is no change in oxygen consumption with exercise; the only detectible change is in terms of perceived effort. Treatment is prolonged and expectant, with anti-depressants widely prescribed. Rest should not be prescribed.

Most CFS patients are not motivated to continue flying while symptomatic. A psychiatric diagnosis should be excluded. While symptomatic, chronic fatigue syndrome is generally incompatible with aviation duties.

**Scleroderma**

In its severest form—progressive systemic sclerosis—this condition can have implications on flying. It is generally found in a population in their third and fourth decades and is more common in females. It can progress rapidly, and involve the hand, resulting in contractures, with marked functional limitation. It can be made worse in cold environments such as often encountered in cockpits with poor environmental control. The CREST syndrome (calcinosis, Raynaud's, oesophageal involvement, sclerodactyly and telangiectasia) often involves pulmonary function, with 15% having pulmonary hypertension. It is important to maintain close supervision through rheumatology follow-up at least annually. Refined pulmonary function testing, CT of lungs and echocardiography will be needed where there is any suspicion of pulmonary involvement.

**Vasculitis**

Polyarteritis nodosum is the most common form. Vasculature anywhere in the body can be involved, and commonly includes the kidneys. Prognosis is always guarded, and certification will be based on history of extent and severity of disease and effectiveness of medication.
Spinal Injury

Whiplash

This condition is something of an enigma, as it tends to be described in only very limited contexts, particularly rear-end motor vehicle accidents. Pathology cannot be demonstrated experimentally. A lateral X-ray should be obtained acutely to exclude instability. A bone scan may be valuable at three weeks to identify bone or connective tissue damage.

Most cases settle very quickly. The principle method of rehabilitation is one of goal setting with steady improvement over several weeks.

Certification should be based on mobility and pain impact. Most cases can be managed by the DAME determining when the certificate holder is fit to return to aviation duties.

Stable fracture of the spine

There should be an expectation of a return to activities within 12 weeks, with an absolute maximum of 26 weeks. The ability to withstand prolonged sitting will be the main decider.

Non-stable fracture of the spine

Where there is operative treatment with insertion of a plate, recovery will be in 12 to 26 weeks. With two fracture levels, there is a longer recovery time, but practically all return to full activity.

Posterior ligament rupture

This is potentially unstable, where two of the three columns in the spine are damaged. Return is based on the treating orthopod advice, but usually should be three months before returning to flying activities.

Spinal fracture with cord lesion

Nearly all such patients will have fixation with pedicle screws. Recovery is usually based on force of injury. It will be necessary to wait for the assessed maximal recovery, and see how the individual is able to function. Urinary tract obstruction is often the main problem. Modifications to the cockpit, such as a Blackwood Pole for pedal manipulation can potentially still permit some flying.

Paraplegia

Once stable and functioning satisfactorily utilising a range of mechanical aids, should the individual wish to undertake aviation activities, functional testing will be required. The main issues will be mobility around the cabin, particularly full and free manipulation of flight controls and emergency egress.
2.  Medical Aspects
2.11  Orthopaedics and Rheumatology

Spinal Stenosis

The diameter of the cord is 11 mm minimum. Where the diameter is less than this, symptoms may occur. Pathology is often found in the lumbar region. There may, however, be smaller sizes found in scans, which have no symptoms. Where the neck is involved, there will usually be a myelopathy. The condition is usually slowly progressive, with nerve root pressure and neurologic claudication. Sitting does not affect the condition significantly, and the result is that pilots are affected very little.

Syringomyelia

This condition is more common in males, and is mostly an incidental finding. Symptoms, when present, tend to be vague, with difficulty in fine motor control in the hands. There is an asymmetric abdominal reflex. An MRI will show Arnold-Chiari malformation or a syrinx. Where there are symptoms, there is usually drainage of the syrinx, and reassessment. Most will be able to continue flying unrestricted.

Scheuermann's Disease

This abnormality of bony development is predominantly found in the lower thoracic vertebrae in males. Longitudinal studies have indicated that it has minimal impact in the long-term, and should not affect flying. Occasionally there is significant scoliosis, which requires a brace for about six months.

Spondylosis

This is an injury to the pars interarticularis. It is not congenital, but is found in 5% of boys by the age of five years. This varies by family history and racial background, and is more common in males. It can occur as a result of overuse in gymnasts and fast bowlers in particular. Rest and attention to technique is the core of treatment.

Spondylolisthesis involves a bilateral lesion with slippage of one vertebral body on the one below. When the slip is at risk of compromising the cord, or there is disability, surgery may be required. There may be some pain or discomfort but generally this does not preclude work.

There is little to suggest that there are any issues for aviation.

Scoliosis

When scoliosis is less than 30° it is of little consequence. Once at 50-60° at the end of its growth, it is often progressive and requires surgical intervention. There is little impact on function or on flying.
2.  Medical Aspects
2.11 Orthopaedics and Rheumatology

**Backache**

Backache, usually lumbar, is very common. Early normalisation of activities is the cornerstone of treatment. Avoidance of twisting is helpful. The few that are not cured within six to 12 weeks should be assessed in a rehabilitation program to seek an underlying problem.

In rotary wing aircraft, the normal posture of forward bending and lateral flexion tends to induce backache. No degeneration is reported from repeated minor stressors. It is usual to not complain of such pain until after retirement from aviation.

**Sciatica**

This is leg pain as a result of pressure on nerve roots. Back pain may also be present, but the leg pain is usually much more prominent. Treatment is expectant, with 50% improvement in 12 weeks, 80% in two years and 95% in five years, while surgery (laminectomy) has a 95% success rate. Recurrence is around 1-2% per annum.

It is possible to be fully active with sciatica without the risk of further damage. Thus, return to flying should be based on symptoms and need for medication.

**Loss of Limb**

Amputation should be considered on the basis of function. Occasionally, phantom pain or a neuroma in the stump can cause discomfort, but this is rare and can be adequately managed. Should the loss of limb be due to a tumour, the risk of recurrence must be taken into consideration.

Above-knee amputation as opposed to below-knee amputation will have a major impact on functionality. The pilot must be able to demonstrate the ability to fully operate the rudders, or modify the aircraft accordingly. A double above-knee amputee is unlikely to be able to fly an unmodified aircraft due to the inability to generate sufficient force to operate the rudders.

Upper limb prostheses that are most functional are not necessarily the most 'natural' in appearance, often being hooks. The loss of digits makes fine manipulation difficult.

**Shoulder Injury**

**Rotator cuff injury.** Most commonly, this is due to supraspinatus tear, and recovery is good. Physiotherapy, with up to three steroid injections can be helpful. Arthroscopic inspection can be useful to identify the pathology more accurately. Ultrasound is not helpful unless the sonographer is very experienced. Time to recover can be from 6 weeks to two years. Once able to move the affected arm through an arc in the functional area, the individual can be returned to flying. Surgical repair is sometimes necessary in the young patient.
Shoulder instability. Three episodes of subluxation or dislocation in a single direction should lead to surgical repair. Where there is multidirectional instability with ligamentous laxity, surgical repair is unhelpful, and effort should be directed to conservative treatment of maximal rehabilitation effort. Strength and balance of muscles is needed to overcome the ligamentous injury.

Frozen shoulder. Early treatment of frozen shoulder with local and oral corticosteroids has been reported as beneficial. In chronic, established cases the orthopaedic aim is to break down adhesions limiting the range of movement and causing pain. Early intervention with manipulation under anaesthesia and steroid injections usually results in recovery. Once again, ability to move in the functional arc for flying is needed before return to flying should be considered.

Lateral Epicondylitis

This condition may be encountered in a number of circumstances, usually involving repetitive activities. The core of the treatment is physical therapy with graduated exercises to increase strength and endurance, remediation of the causative activity, and steroid injections into the affected tendon complex are beneficial. Resumption of activity too soon often results in recurrence. Each case should be considered in its merits, based on forearm strength and exacerbating actions.

Carpal Tunnel Syndrome

Typical CTS symptoms involving the median nerve distribution at the wrist, will often respond to conservative treatment modifying activities combined with steroid injection. Surgery is usually curative. With arthroscopic surgery in experienced hands, the individual can return to work within four weeks, while open surgery recovery requires somewhat longer. Return to flying will be based on an assessment of strength and endurance of the wrist.

Upper Limb Fractures

The presence of a plaster is a difficult situation to assess. It is best to not attempt to fly while there is an upper limb plaster in place. A better option from the aviation perspective is usually a pin, possibly with a small splint, which will permit continued activity.

Each case needs to be based on functional capability, which should be assessed by the DAME. If there is a desire to fly while there is a plaster in place, or there is doubt about functional capacity, then a functional test, carried out by a CFI or ATO would be appropriate.
Lower Limb Fractures

Lower limb fractures often take 6 months to heal adequately for normal function. However, many fractures are pinned, or can have an inflatable plaster that is only inflated when putting stress through the bone. Thus, most lower limb fractures will be compatible with continued flying. The DAME should assess likely functional limitations of aviation relevance.

Knee Derangement

Following an anterior cruciate ligament rupture, there will be a period where the pilot is unfit for flying. Without surgery, this is likely to be around six weeks. With surgery, the expectation would be around three months. Medial collateral ligament tear will have little impact on flying.

Arthrodesis

Following an arthrodesis, activity is generally near normal. For flying, a hip arthrodesis will be nearly impossible due to the limitation of mobility. Knee arthrodesis is difficult and will require in flight assessment, while ankle arthrodesis should not produce significant difficulties.
2. Medical Aspects
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2.12.1 Ear, Nose and Throat Standard – CASR Part 67

The ear, nose and throat standards are found in the following paragraphs of CASR Part 67:

**CASR 67.150** For medical standard 1
- CASR 67.150(7)
- Table 67.150
  - 1.27 – 1.28

**CASR 67.155** For medical standard 2
- CASR 67.155(7)
- Table 67.155
  - 2.26 – 2.27

**CASR 67.160** For medical standard 3
- CASR 67.160(7)
- Table 67.160
  - 3.25 – 3.26

2.12.2 Hearing Requirements Standard – CASR Part 67

The hearing requirements standards are found in the following paragraphs of CASR Part 67:

**CASR 67.150** For medical standard 1
- CASR 67.150(7)
- Table 67.150
  - 1.29 – 1.30

**CASR 67.155** For medical standard 2
- CASR 67.155(7)
- Table 67.155
  - 2.28 – 2.30

**CASR 67.160** For medical standard 3
- CASR 67.160(7)
- Table 67.160
  - 3.27 – 3.28

2.12.3 Examination of the Ear

There should be no signs of active disease of the middle ear cavity. Applicants should be able to ventilate the middle ear.

Perforations of the tympanic membrane are acceptable, however the cause of the condition should be sought and investigations initiated, if appropriate.
2.12.4 Hearing

An applicant for a Class 2 Certificate must be able to hear an average conversational voice at two metres with the back to the examiner. Accordingly, applicants who are deaf in one ear may pass.

More rigid standards apply to professional licence holders. Audiograms are required for initial Class 1 and 3 and at defined intervals thereafter.

If any doubt arises as to the acceptability of an applicant's hearing, an audiogram should be obtained and, if appropriate, specialist consultation recommended. The audiogram printout should be enclosed with the medical report for initial issue Class 1 and 3 examinations.

Audiograms are acceptable from any qualified audiologist. Where the deficit is long-standing and has been previously recorded, an audiogram should be provided to demonstrate that there has been no significant deterioration.

If a supplementary speech test is required, this should only be performed by an audiologist provided calibrated tapes and other required equipment are available.

If the applicant fails the speech-based hearing test, in some cases an in-flight test may be offered if he/she has a high level of aeronautical experience. Such an operational check will involve evaluation of relevant aspects of the applicant's hearing by a CASA Flying Operations Inspector or an Authorised Testing Officer with test material transmitted from a control tower. Ideally the test should be conducted in the class of aircraft, which is the same as that which the applicant normally operates or intends to operate.

Applicants for Class 2 Certificates may wear hearing aids during testing. Any applicant who meets the hearing standard in this way is required to wear the aid during all communications on the ground that relate to the conduct of a flight. Adequate amplification during flight may be achieved by the use of headphones. Headphones with ear cups have the added advantage of blocking out aircraft noise. All pilots should be encouraged to fly with headphones, in the interests of improving hearing and for hearing conservation.

2.12.5 Vestibular Function

Any history of vertigo or dizziness should be fully investigated and the presence of nystagmus noted. If there is concern about vestibular function, referral for caloric testing and electronystagmography should be considered.
2.12.6 Speech

Any significant speech impediment or stuttering should be reported, and full details are required. As a minimum, reports from an ENT specialist and from a speech pathologist should be obtained and forwarded to Aviation Medicine Section, together with the DAME’s own assessment of the condition and its likely effects on the safety of air navigation.

2.12.7 Sinuses

Applicants with acute sinusitis are "temporarily unfit" for aviation duties. Chronic sinusitis is unacceptable until appropriately referred, treated and improved.
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2.13.1 Introduction

The increasing use of drugs, both prescribed and self-administered, within the Australian community, presents a significant challenge to DAMEs when determining an applicant’s fitness for aviation related duties. All drugs, even those purchased “over the counter (OTC)”, may have adverse effects that may render aircrew members or air traffic controllers unsafe to fly or to perform their normal duties.

General Principles

As a general principle, DAMEs should assume all medications are hazardous for aviation operations until demonstrated otherwise.

When assessing whether a pilot or Air Traffic Controller (ATC) taking medication is fit for aviation-related duties, two principal issues should be considered:

- The potential for the underlying medical condition to affect fitness for flying or controlling duty
- The potential for the treatment (including drug therapy) to reduce fitness for flying or controlling duty.

The following characteristics of specific compounds will influence the limitations on their safe use in the aviation environment:

- Unwanted, dose-related drug effects (e.g. blurred vision or drowsiness)
- Hypersensitivity/allergic reactions
- Idiosyncratic effects
- Drug side effects that may occur in some of the population (eg, nausea, liver damage or bone marrow suppression)
- Drug combination effects – potentiation
- Drug interactions; particularly with alcohol, to increase risk of side effects or reduce activity of the drug/s.
Virtually all drugs unacceptable for aviation duties, regardless of the nature of the disorder being treated, have one or more of the following effects:

- CNS depression
- CNS stimulation
- Autonomic nervous system disturbance
- Disturbance of equilibrium.

**Determination of Fitness for Aviation Duty when Taking Medications**

It is not practicable in this chapter to indicate whether a specific drug or even class of drug is always compatible with safe flying or controlling. Rather, this chapter provides a general overview of many commonly used medications and their use in the flying environment. Whenever a DAME is in doubt about a pilot or controller who is taking a drug or medication, advice should be obtained from the CASA Aviation Medicine Section.

With regard to their effect on fitness for aviation duties, medications may be divided into five groups:

A. Those medications considered safe when flying or controlling.

B. Those medications generally considered compatible with aviation duties without restrictions once the possibility of idiosyncratic reaction has been eliminated (generally after a period of ground trial). Applicants using these substances may be cleared to exercise the privileges of their licences by a DAME.

C. Those medications which may be compatible with aviation duties, but which require a specific assessment by CASA. Only CASA can clear pilots and ATCs to use these drugs while performing aviation-related duties.

D. Drugs that are not compatible with flying or ATC duties.

E. Those medications that do not fit any of the above groups, or where there is uncertainty. In such cases, the DAME should either:
   - Contact CASA’s Aviation Medicine Section prior to any decision to certificate or not certificate a licence holder or applicant; or
   - Not endorse the certificate and refer the matter to AMS for determination.

[End of page]
A. Medications compatible with flying or controlling

The following medications may be taken without consultation:

- Simple analgesics such as single doses of aspirin, paracetamol, and ibuprofen to provide analgesia may be used for minor self-limiting conditions. Paracetamol is preferable as there is less risk of gastric irritation. Medications containing Codeine should not be used for this purpose.

- Simple antacids may be used for mild isolated episodes of gastric disturbance. Mixtures containing anticholinergics or antispasmodics should not be used by an applicant engaged in aviation duties. Simple antacids do not include H₂ receptor antagonists.

- Antidiarrhoeals such as kaomagma, kaopectate and bismuth subcitrate are acceptable for mild afebrile diarrhoea.

- Nasal sprays such as oxymetazoline or phenylephrine, to be used as a ‘get-me-down’ should unexpected ear or sinus block occur during flight.

- Non-prescription suppositories and topical anorectal ointments/creams used to treat simple haemorrhoids.

- Topical medications including antiseptics, topical acyclovir, antifungals, weak steroid creams or benzoyl peroxide used for minor wounds and skin conditions, vaginal creams/pessaries and suppositories.

   Note: Schedule 4 (prescription only) items such as topical antibiotics and tretinoin skin applications are not included.

- Oral Contraceptive Pill (combined OCP or mini-pill), injectable progesterone contraceptives and implantable progesterone contraceptives.

- Nicotine gum, patches or sprays used for smoking cessation.

- Steroid nasal sprays used to treat hay fever.

- Moistening or simple astringent eye drops

B. Medications requiring ground trial before DAME approval of use when flying or controlling

Pilots and ATCs taking the following medications require a ground trial (and/or AMS consultation) prior to DAME approval to fly or control:
2. Medical Aspects
2.13 Medication – Drugs and Flying/Controlling

- **Anaesthetics.** Medical certificate holders require clearance from a medical practitioner following the administration of any anaesthetic agent:
  - Minimum of 12 hours following local or regional (including dental) anaesthetics. (The condition for which the anaesthetic has been administered must also be considered prior to returning an individual to flying or controlling duties).
  - Minimum of 48 hours following general, spinal or epidural anaesthetic. This proscription includes drug-induced sedation. (The condition for which the anaesthetic etc has been administered must also be considered prior to returning an individual to flying or controlling duties).

- **Hypnotics.** Medical certificate holders should not fly or control for at least 12 hours after ingesting the sleep-inducing agent Temazepam. Medical certificate holders should not fly or control for at least 8 hours after using the sleep-inducing agent Zolpidem. Pilots and ATCs who use Temazepam or Zolpidem should not combine these drugs with alcohol. The use of the sleep-inducing agent Triazolam is not compatible with flying or controlling duties due to its potential CNS side effects. The use of Melatonins is not supported by CASA due to variation in its formulation and variability in its effects.

- **Antibiotics (oral and topical).** Medical certificate holders may continue to undertake flying or controlling duties when taking antibiotics provided:
  - the infectious condition being treated will not significantly interfere with aviation-related activities and will not be exacerbated by the specific operating environment, and
  - the prescribing medical practitioner or DAME has determined there are no adverse drug reactions from the antibiotic which has been prescribed. This would normally involve a short (approximately 48 hour) ground trial or previous use of the same antibiotic.

- **Immunisations.** Medical certificate holders should not undertake aviation-related duties for 24 hours after receiving the following vaccinations (primary and boosters):
  - Adult diphtheria and tetanus
  - Poliomyelitis
  - Hepatitis A & B
  - Measles, mumps, rubella
  - Yellow fever
  - Typhoid
  - Tuberculosis (Mantoux Test or Bacille Calmette-Guerin);
  - Influenza
  - Varicella
  - Meningococcal
  - Pneumococcal
  - Cholera.
Class 3 medical certificate holders receiving these vaccinations will usually remain fit for duty, but should consult a GP or DAME in individual cases of doubt.

After receiving the following immunisations (primary and boosters) there should be no aviation-related duties for a minimum of 72 hours:
- Japanese Encephalitis.

**Non-sedating antihistamines**

**C. Medications which may be compatible with aviation duties, but which require specific assessment by CASA**

For many of the following medications, it is important to note that they will be prescribed to treat particular conditions. Refer to the relevant section regarding certification requirements for that condition as well as to the issues discussed here.

CASA approval is required prior to pilots and ATCs who are taking the following classes of medications returning to flying or controlling duties:

- **Sedating Antihistamines:**
  - These should only be used when there is at least 12 hours between use and commencing aviation-related duties.

- **Antihypertensives:**
  - ACE inhibitors
  - Calcium channel blockers
  - Diuretics
  - Beta blockers.

- **Antiarrhythmics:**
  - Quinidine
  - Disopyramide
  - Verapamil
  - Amiodarone
  - Digoxin.

- **Gout medications:**
  - Allopurinol (colchicine is not usually suitable)
  - Probenecid
  - Non-steroidal anti-inflammatory medications.

- **Hypolipidemic drugs:**
  - HMG-COA reductase inhibitors
  - Gemfibrozil (gemfibrozil and statin medications are not to be used together)
  - Cholestyramine (colestipol is not suitable).
2. Medical Aspects
2.13 Medication – Drugs and Flying/Controlling

- **Ophthalmological preparations:**
  It is possible for patients to absorb sufficient beta-blocker through ocular administration to affect cardiovascular response to exertion/exercise.
  - Timolol (glaucoma)
  - Betaxolol (glaucoma).

- **Thyroid disease:**
  - Thyroxine requires a 14-day trial.

- **Antidepressants.**
  - Selected non-sedating selective serotonin reuptake inhibitors (SSRIs) require a minimum of 28 days ground trial. The underlying condition should be considered prior to returning the aviator to duty. MAOIs and tricyclic antidepressants are not generally considered compatible with aviation-related duties. (Also see section 2.6 Psychiatry.)

- **Other medications:**
  - Oral acyclovir or famcyclovir for genital herpes
  - Griseofulvin or terbinafine for systemic antifungal therapy requires a 28-day trial. Monthly liver function testing is required
  - Omeprazole for oesophagitis and peptic ulceration maintenance therapy, following endoscopic confirmation of ulcer healing
  - Ranitidine for peptic ulceration maintenance therapy, following endoscopic confirmation of ulcer healing
  - Clomiphene to enhance oogenesis
  - Sucralfate for non-ulcerative GI symptoms
  - Tetracycline (low dose, for long term treatment of acne)
  - Sulfasalazine for prophylaxis of well controlled ulcerative colitis
  - Sulfamethoxazole/trimethoprim for chronic urogenital tract infections.

When these classes of medications are prescribed, the following actions should be taken:

- **Ground trial:** The length of the ground trial will be determined on a case-by-case basis in consultation with CASA Aviation Medical staff, and will also depend on control of the underlying disorder and any side effects of the medication.

- **Consultation:** The DAME should contact CASA Aviation Medicine Section to discuss specific requirements for an applicant using or proposing to use any medication whose side effect profile is unknown or of possible concern.
D. Medications not acceptable for/not compatible with aviation related duties

The following medications are not compatible with aviation related duties and are never to be approved for use by a medical certificate holder without prior specific written approval by CASA.

- Narcotics
- Insulin
- Amphetamine
- Cytotoxics
- Psychotropic medications
- Anticoagulants
- Nitrates
- Complex antidiarrhoeals. Mixtures containing antispasmodics (eg, Lomotil, Imodium) are not usually compatible with aviation-related duties.

E. Other medications such as vitamins, minerals and herbal preparations

Aircrew are to treat herbal medications as they would any other OTC medication. There is a potential for unforeseen consequences when taking such preparations and aircrew and ATCs should consult a DAME for advice before taking such medications and performing aviation-related duties.

Vitamins, minerals and dietary supplements

In Australia, all medicinal therapeutic products must carry an AUST L or AUST R number on the label, unless exempt. Vitamins and minerals are considered listed therapeutic goods meaning quality and safety factors have been assessed by the Therapeutic Goods Administration. In general, pilots and ATCs should not exceed the Recommended Daily Allowances for these products.

Herbal preparations

Herbal preparations are widely available in the community, and are seen by many as a “natural” alternative to conventional medicine. Unfortunately, such agents are not always subject to the same stringent regulations that apply to registered medicinal compounds as noted above. In addition, many of these preparations contain agents that may interact with other drugs and have the potential to cause side effects that are incompatible with flight safety. CASA considers routine use of herbal preparations as being incompatible with flying or controlling duties.
Herbal preparations are derived from plant parts or oils. One should bear in mind that there are no standards for quality, potency, safety or efficacy in their manufacture. Identical products may differ markedly between manufacturers or batches by the same manufacturer. Additionally, many drugs are derived from the same plants used in the herbal preparations. Therefore, many herbal preparations have the same potential side effects as manufactured drugs.

Several herbal preparations present particular threats to aviation safety, alertness, or physical well-being. Below are some of the herbal preparations known to be potentially dangerous.

- **Hallucinogens.** The following may cause hallucinations or disorientation:
  - Californian poppy
  - European mandrake
  - Kava-kava
  - Magic mushrooms
  - Nutmeg (in doses greater than a tablespoon)
  - Periwinkle
  - Thorn apple
  - Yohimbe bark.

- **Sedatives.** The following may cause drowsiness, slow reaction time, or disorientation:
  - Celandine
  - Deadly Nightshade
  - Hemlock
  - Henbane
  - Hops
  - Indian snakeroot
  - Jimson weed
  - Jin bu huan
  - Opium poppy
  - Passion flower
  - Scopolia
  - Skullcap
  - Valerian
  - Wild lettuce
  - Wolfsbane.
2.13 Medication – Drugs and Flying/Controlling

- **Cardiovascular effects.** The following may cause heart palpitations or precipitate myocardial ischaemia/infarction.
  - Broom
  - Ephedra
  - Indian snakeroot
  - Lily of the Valley
  - Pheasant’s eye
  - Purple foxglove
  - Squill
  - Stophanthus
  - White squill
  - Yellow foxglove.

- **Liver poisons.** The following may cause drowsiness, slow reaction time, or disorientation:
  - Borage
  - Chapperal
  - Colts foot
  - Comfrey
  - Germander
  - Life root
  - Thread leafed groudsel.

The DAME often lacks clinical information sufficient to be able to quantify the aeromedical risk from use of herbal preparations. The following questions will be of benefit in evaluating the safety (or otherwise) of these agents:

- Is the use of the preparation due to signs or symptoms that suggest an underlying medical problem separate from the preparation in question?
- Is any component known to have neuropsychotropic effects?
- Is the preparation likely to contain unlabelled or incorrectly labelled ingredients?
- Is the preparation being used in a dose range far outside that of current experience or in an extremely concentrated form?
- Is any component of the preparation known to cause physical harm (even infrequently, unless the quantified incidence of adverse effects is known)?
- Is the preparation an alcohol-based tincture, tonic or elixir?

If all answers are negative, it is difficult to justify prohibition of the particular agent. Any positive answers must be dealt with by education, treating the underlying condition, not endorsing the medical certificate, or referring the matter to Aviation Medicine Section at CASA.
2. Medical Aspects
2.14 Malignancy

2.14.1 Introduction

Malignancy poses a threat to flight safety for a number of reasons including:

- Direct effect(s) of the primary tumour
- Effect(s) of secondary spread
- Effect(s) of treatment modalities
- Psychological effect
- Cachexia
- Endocrine or Biochemical disturbances.

Any pilot or Air Traffic Controller (ATC) diagnosed with a malignancy must refrain from aviation or air traffic control duties until fitness to return to such duties is assessed by CASA.

Automatic return to flying or controlling status should not be assumed. Some pilots and ATCs may be medically certificated following diagnosis and adequate treatment of their malignancy, provided there is an adequate program of ongoing surveillance. Others will require a lengthy period prior to certification due to ongoing symptoms or the risk of recurrence of the primary or metastatic spread. In some circumstances re-certification will not be approved.

Prior to medical certification on a pilot or ATC suffering from cancer, CASA must be sure that an applicant:

- Has recovered from the primary treatment
- Has no sign of residual tumour, of tumour spread or of secondary manifestations of tumour
- Is psychologically stable enough to undertake aviation duties.

Re-certification will depend on the likelihood and type of recurrent disease and the risk that it will adversely affect flight safety.
2.14.2 Principles of Aeromedical Certification of Pilots/ATCs with Malignancy

When considering the aeromedical risk (and therefore the risk to aviation safety) posed by a pilot or ATC suffering from a malignancy, CASA will evaluate:

- Cancer specific issues such as:
  - The type of cancer (tissue and histological diagnosis)
  - Likelihood of recurrence
  - Site of recurrence
  - Presence of any para-neoplastic syndromes
  - Potential for a recurrence to cause overt or subtle in-flight incapacitation.

- Issues related to the treatment of the cancer.

2.14.3 Cancer Specific Issues

Histological variants of a particular tissue cancer may behave biologically differently from other variants. Therefore, when assessing the aeromedical risk of a pilot or ATC with a malignancy, accurate tissue diagnosis of the malignancy is essential.

Complications of the Malignancy

Potential complications of malignancy will affect CASA’s assessment of fitness for aviation related duties. Malignancy may lead to pain, wasting, neuropathy, nausea, anorexia, seizures, hypercalcaemia, hyperuricaemia, viscus obstruction, and organ failure. Some cancers have para-neoplastic syndromes associated with their presence. These syndromes result from excessive or ectopic hormones synthesized by a tumour, immune complexes, ectopic receptor production, or release of physiologically active compounds and may manifest in a variety of ways. Most para-neoplastic syndromes have serious implications for aviation safety.

Likelihood of Recurrence

Figure 1 depicts the overall survival curve for individuals diagnosed with a theoretical malignancy. For most cancer types, annual recurrence rates can be calculated from survival curves. (As cure following recurrence is rare, overall survival approximates recurrence).
2.14 Malignancy

Staging

Recurrence rates are greatly influenced by the stage of disease when primary treatment occurred. Many cancers are staged using a TNM (Tumour, Node, Metastasis) classification. Figure 2 depicts the variation in survival rates for a theoretical cancer according to the degree of spread evident at diagnosis.

Tumour Marker

Tumours may synthesize proteins that produce no clinical symptoms, eg, β-human chorionic gonadotropin, α-fetoprotein, carcinoembryonic antigen, CA 125, and CA 153. These protein products may be used as tumour markers in the serial evaluation of patients for determining disease recurrence or response to therapy. These markers may assist CASA in assessing the suitability of a pilot or ATC to return to aviation duty, as they can often be valuable in tracking response to treatment or recurrence of disease.
Site of recurrence

Each tumour has a characteristic pattern of recurrence. Thus for a theoretical tumour, metastases might occur according to the distribution indicated in Table 1.

Table 1: Distribution of metastasis for a theoretical cancer

<table>
<thead>
<tr>
<th>Site</th>
<th>Incidence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local and lymph nodes</td>
<td>60</td>
</tr>
<tr>
<td>Liver</td>
<td>20</td>
</tr>
<tr>
<td>Lung</td>
<td>10</td>
</tr>
<tr>
<td>Bone</td>
<td>5</td>
</tr>
<tr>
<td>Bone marrow</td>
<td>3</td>
</tr>
<tr>
<td>Brain</td>
<td>2</td>
</tr>
</tbody>
</table>

Risk of particular metastasis causing incapacitation

Several assumptions are made when assessing the risk of a particular metastasis causing incapacitation (either subtle or overt). For a theoretical cancer, recurrence in a regional lymph node carries a relatively small risk of incapacitation. On the other hand, brain metastasis has a near-100% potential for incapacitation (whether sudden due to a fit or bleed, or subtle as a result of pressure effects or headache etc). Thus the incapacitation risk weighting for a theoretical cancer may be as depicted in Table 2.

Table 2: Notional risk of incapacitation from metastasis

<table>
<thead>
<tr>
<th>Site</th>
<th>Incapacitation weighting (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local and lymph nodes</td>
<td>1</td>
</tr>
<tr>
<td>Liver</td>
<td>5</td>
</tr>
<tr>
<td>Lung</td>
<td>5</td>
</tr>
<tr>
<td>Bone</td>
<td>5</td>
</tr>
<tr>
<td>Bone marrow</td>
<td>20</td>
</tr>
<tr>
<td>Brain</td>
<td>100</td>
</tr>
</tbody>
</table>

Total risk of incapacitation

From the parameters defined above, a total risk of incapacitation can be calculated:

- Recurrence rate per year for the particular stage of the malignancy
- Frequency of metastatic disease in a particular organ
- Risk that metastasis in that organ will cause incapacitation.
Thus for an early stage cancer, the result of a calculation of the risk of incapacitation from brain metastasis may be:

\[ 3\% \times 3\% \times 100\% = 0.09\% \text{ for the first year} \]

For a theoretical late stage cancer from bone marrow metastases, the risk may be:

\[ 15\% \times 3\% \times 100\% = 0.45\% \text{ for the first year.} \]

In order to determine the overall risk, it is necessary to add the risks from all the possible recurrence sites.

### 2.14.4 Treatment Related Issues

In general, cancer is treated in one (or a combination) of the following ways:

- **Surgery** is the commonest treatment for malignant disease, and often is the only treatment. Aeromedical certification after surgery for cancer depends on the extent and success of the operation. Complications of surgery are considered on their merits, taking into account the underlying medical condition and the overall health of the affected individual.

- **Radiotherapy** is usually delivered as an intensive course. The aim may be curative, for example where an isolated group of lymph nodes have been shown to contain malignant cells, or as adjuvant therapy where lymph nodes are assumed to contain metastatic tumour. During the active part of radiotherapy treatment, pilots and ATCs will be assessed as temporarily unfit for duty. Following radiotherapy many patients suffer non-specific systemic effects, such as tiredness, malaise and nausea, which makes it inappropriate for them to partake in aviation activities at least until such effects have resolved. Occasionally there are long-term effects after radiotherapy, such as scarring, which may preclude fitness for aviation duties.

- **Chemotherapy**. During acute chemotherapy treatment (whether curative or adjuvant), pilots and ATCs will be assessed as temporarily unfit, as all chemotherapy drugs are cytotoxic, and frequently have a significant effect on normal tissue, such as rapidly dividing cells in the bone marrow. Once active chemotherapy has ceased and side effects have resolved, aeromedical certification may be possible and will be considered on a case-by-case basis. In some cases low doses of chemotherapy agents may be prescribed as maintenance therapy. Where CASA considers that such medications do not reduce aviation safety, aeromedical certification may be considered, also on a case-by-case basis.
2.14 Malignancy

Hormonal therapy. Endocrine therapy is used as part of the treatment of some cancers (such as hormone and anti-hormone treatment following breast and prostate cancer). Pilots and ATCs may be returned to flying or controlling if there are no side effects from their hormonal therapy. In all cases, the decision to return to duty while on cancer chemotherapy will be made by CASA Aviation Medicine Section (AMS), on a case-by-case basis, when absence of adverse disease effects is confirmed.

Complementary or alternative medicine. These modalities are commonly used by patients in the treatment of malignancy, particularly where the primary treatment modalities have failed to produce a cure. Where such treatments are used in the presence of continued active disease, the applicant is assessed as unfit. Where the treatment is used to prevent onset of malignancy or recurrence, the treatment will be considered on a case-by-case basis, with regard to the individual’s overall health and the potential effect of the treatment. Herbal medications are discussed in Section 2.13 Medication. All such cases should be referred to CASA AMS for consideration.

2.14.5 Specific Malignancies

The commonest forms of malignant disease in the Australian pilot and ATC population are (in order):

- Prostate cancer
- Malignant melanoma
- Bowel (colon) cancer
- Non-Hodgkin’s lymphoma
- Cancer of the testis (multiple types)
- Bladder cancer
- Kidney cancer
- Cancer of the rectum/anus
- Breast cancer
- Hodgkin’s lymphoma.

The following discussion relates to the five most commonly encountered malignancies in the aviation population in Australia, as well as Hodgkin’s Disease. Information on re-certification following diagnosis with such malignancies is to be taken as guidance and indicative only. CASA will address each case individually and make a decision based on its unique issues. In general, DAMEs and certificate applicants may anticipate an outcome along the lines described as a way to plan for possible grounding periods. Applicants should endeavour to provide specialist evidence and opinion to refute the guidance below should there be a request to return to multi-crew or solo flying or controlling prior to the times indicated.
Prostate Cancer

Adenocarcinoma of the prostate is the commonest malignancy in men aged 50 years or more in Australia, and the incidence increases with each decade of life. Hormonal influences undoubtedly play a role in the aetiology of adenocarcinoma. Grading is based on architectural patterns and is commonly reported as the Gleason score: the primary (most prevalent) grade (1-5) plus the secondary (next most prevalent) grade (1-5); thus, it ranges from 2 (very well differentiated) to 10 (very poorly differentiated). Staging is described in Table 3.

Table 3: Staging of prostatic cancer

<table>
<thead>
<tr>
<th>Staging System</th>
<th>Characteristics of Tumour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whitmore</td>
<td>AJCC/TNM</td>
</tr>
<tr>
<td>A T1</td>
<td>Is clinically inappropriate by palpation or imaging</td>
</tr>
<tr>
<td>T1a</td>
<td>Is an incidental finding in ≤ 5% of resected tissue</td>
</tr>
<tr>
<td>T1b</td>
<td>Is an incidental finding in &gt; 5% of resected tissue</td>
</tr>
<tr>
<td>T1c</td>
<td>Is identified by needle biopsy performed for an elevated prostate-specific antigen level</td>
</tr>
<tr>
<td>B T2</td>
<td>Is palpable or reliably visible on imaging; is confined to prostate</td>
</tr>
<tr>
<td>T2a</td>
<td>Involves one lobe</td>
</tr>
<tr>
<td>T2b</td>
<td>Involves both lobes</td>
</tr>
<tr>
<td>C T3</td>
<td>Extends through the prostatic capsule</td>
</tr>
<tr>
<td>T3a</td>
<td>Has extracapsular extension (unilateral or bilateral)</td>
</tr>
<tr>
<td>T3b</td>
<td>Invades seminal vesicles</td>
</tr>
<tr>
<td>D T4</td>
<td>Is fixed or invades adjacent structures</td>
</tr>
</tbody>
</table>

AJCC = American Joint Committee on Cancer
TNM = tumour node metastasis

Symptoms, Signs, and Diagnosis

Prostatic cancer is usually slowly progressive and may cause no symptoms. In late disease, symptoms of bladder outlet obstruction, ureteral obstruction, and hematuria may appear. Metastases to the pelvis, ribs, and vertebral bodies may cause bone pain. Carcinoma is often diagnosed incidentally when malignant changes are found in the tissue removed during surgery for suspected benign prostatic enlargement.

Elevated serum acid phosphatase or Roy test (an enzymatic method) correlates well with the presence of metastatic prostate cancer, particularly in lymph nodes. Although acid phosphatase and Prostatic Specific Antigen (PSA) levels decline after treatment and rise with recurrence, PSA is the more sensitive marker for monitoring cancer progression and response to therapy. However, because serum PSA is moderately elevated in 30 to 50% of patients with benign prostatic hyperplasia (depending on prostate size and degree of obstruction) and in 25 to 92% of those with prostate cancer (depending on tumour volume), its role in early detection and staging is unclear. Significantly elevated PSA levels suggest extracapsular extension of tumour or metastases.
Prognosis and Treatment
Long-term local control—even cure—is possible. However, the potential for cure, even in patients with clinically localized cancer, depends on factors such as grade, stage, and pretreatment PSA level. For patients with low-grade, organ-confined tumours, survival is virtually identical to that for age-matched controls without prostate cancer.

Most patients elect to undergo definitive therapy with radical prostatectomy or radiotherapy. Radical prostatectomy is probably optimal for younger patients with longer life expectancy; they have the lowest risk of urinary incontinence. Radiotherapy may offer comparable results, especially in patients with low pretreatment PSA levels.

An asymptomatic patient with a locally advanced tumour or metastases may benefit from hormonal therapy with or without adjuvant radiotherapy. Hormonal therapy rarely uses exogenous estrogens, which pose an increased risk of cardiovascular and thromboembolic complications.

Medical Certification
Cancer of the prostate has a generally good prognosis, and tends to metastasise locally or to bone. Once primary treatment has been completed, certification will be possible where:
- There is no evidence of metastatic spread
- PSA has returned to normal
- There are no significant consequences of treatment, such as incontinence.

Should there be metastatic spread which has been controlled and PSA has returned to less than 10, certification will also be considered. Certification will be for no more than 12 months. Each CASA medical examination and report must be accompanied by a progress report from a urologist or oncologist, and a recent PSA level. If the applicant shows no signs of recurrence after three years from initial diagnosis, no further follow-up is required. Where there is metastatic spread surveillance will likely be lifelong. Provided no other medical conditions preclude it, there can be a return to regular certification procedures for age and Class.

Malignant Melanoma
Malignant melanoma is the second commonest malignancy in the Australian aircrew and ATC population. The incidence is rising. Sun exposure is a risk, as is family history and the occurrence of lentigo maligna, large congenital melanocytic naevus, and the dysplastic naevus syndrome.

About 40 to 50% of malignant melanomas develop from pigmented moles. Almost all of the rest arise from melanocytes in normal skin. Signs of malignant transformation should be carefully sought: change in size; change in colour, especially spread of red, white, and blue pigmentation to surrounding normal skin; change in surface characteristics, consistency, or shape; and signs of inflammation in surrounding skin, with possible bleeding, ulceration, itching, or pain.
Malignant melanomas vary in size, shape, and colour (usually pigmented) and in their propensity to invade and metastasize. This neoplasm may spread rapidly, causing death within months of its recognition, yet the 5-year cure rate of early, very superficial lesions is nearly 100%. Cure depends on early diagnosis and early treatment. The major types of malignant melanoma are:

- Lentigo maligna melanoma
- Superficial spreading melanoma: accounts for 2/3 of malignant melanomas
- Nodular melanoma: constitutes 10 to 15% of malignant melanomas

**Prognosis and Treatment**

Two classification systems are useful for evaluating melanomas:

- Melanoma thickness as measured from the granular layer of the epidermis to the greatest depth of tumour invasion, as described by Breslow.
- Anatomic level of invasion, as described by Clark. In Clark's classification, level I is confined to epidermis; level II extends into papillary dermis; level III extends further into papillary dermis, with expansion of this layer; level IV extends into reticular dermis; and level V extends into subcutaneous fat.

Increased Breslow thickness and deeper invasion (Clark level) correlate with poorer prognosis. The clinical type of tumour is less important to survival than the thickness of the tumour at the time of diagnosis.

Metastatic spread of melanoma occurs both via lymphatics and blood vessels. Local spread results in formation of nearby satellite papules or nodules that may or may not be pigmented. Direct metastasis to skin or internal organs may occur, and occasionally metastatic nodules or enlarged lymph nodes are discovered before the primary lesion is identified. Melanomas arising from mucous membranes have a very poor prognosis, although they often seem quite limited when discovered.

Treatment is by surgical excision. Although the width of margins is debated, most experts agree that a 1-cm lateral tumour-free margin is adequate for lesions <1 mm thick. Thicker lesions may deserve more radical surgery and sentinel node biopsy.

Thick malignant melanomas and regional or distant metastasis may be treated with chemotherapy. Prognosis is poor.
2.14 Malignancy

Table 4: Five-year survival for malignant melanoma

<table>
<thead>
<tr>
<th>Tumour Thickness (mm) *</th>
<th>5-Year Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76</td>
<td>98 - 100</td>
</tr>
<tr>
<td>0.76 - 1.5</td>
<td>90 - 94</td>
</tr>
<tr>
<td>1.51 – 2.25</td>
<td>83 – 84</td>
</tr>
<tr>
<td>2.26 – 3.0</td>
<td>72 – 77</td>
</tr>
<tr>
<td>&gt; 3.0</td>
<td>46</td>
</tr>
</tbody>
</table>

* Tumour thickness is very difficult to assess if histological signs of regression are present.

Aeromedical Certification

Following diagnosis of a malignant melanoma, CASA will not certificate a pilot or ATC for the first 12 months because of the risk of spread to organs such as the brain, lungs or bone. The associated risk of incapacitation is significant. In some circumstances where the prognosis is extremely positive, certification prior to 12 months may be considered.

Class 1 and 3: In the absence of recurrence, CASA will usually approve Class 1 and 3 certification as follows:

Table 5: Post-malignant melanoma certification (Class 1 and 3)

<table>
<thead>
<tr>
<th>Tumour thickness</th>
<th>Certification</th>
<th>Period post-diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>0.76 – 1.49 mm</td>
<td>Multicrew</td>
<td>12 months</td>
</tr>
<tr>
<td>1.5 – 2.24 mm</td>
<td>Solo</td>
<td>24 months</td>
</tr>
<tr>
<td>2.25 – 3.0 mm</td>
<td>Multicrew</td>
<td>12 months</td>
</tr>
<tr>
<td>&gt; 3.0 mm</td>
<td>Multicrew</td>
<td>48 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>60 months</td>
</tr>
</tbody>
</table>
Class 2: In the absence of recurrence, CASA will usually approve Class 2 certification as follows:

<table>
<thead>
<tr>
<th>Tumour thickness</th>
<th>Certification</th>
<th>Period post-diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>0.76 – 1.49 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>1.5 – 2.24 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>2.25 – 3.0 mm</td>
<td>As or with co-pilot</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>24 months</td>
</tr>
<tr>
<td>&gt; 3.0 mm</td>
<td>As or with co-pilot</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>36 months</td>
</tr>
</tbody>
</table>

Certification will be for no more than 12 months, and renewal medical examinations and reports must be accompanied by a progress report from the treating dermatologist or oncologist. These reports will be required for at least 3 years following return to unrestricted duties.

Colorectal (Bowel) Cancer

In Western countries, cancers of the colon and rectum account for more new cases of cancer per year than cancer of any other anatomical site except the lung. Colorectal cancer is the most frequent cause of death from visceral malignancies that affect both sexes. The incidence of this condition begins to rise at age 40 and peaks at age 60 to 75 years. Colorectal cancer spreads by direct extension through the bowel wall, haematogenous metastasis, regional lymph node metastasis, perineural spread, and intraluminal metastasis.

Symptoms, Signs, and Diagnosis

Adenocarcinoma of the colon and rectum grows slowly, and a long interval elapses before it is large enough to produce symptoms. Early diagnosis depends on routine examination. Symptoms depend on the lesion’s location, type, extent, and complications. In cancer of the rectum, the commonest presenting symptom is bleeding with defecation. Whenever rectal bleeding occurs, even with obvious haemorrhoids or known diverticular disease, coexisting cancer must be excluded. Simple, inexpensive testing of the stool for occult blood is advised as part of both screening and high-risk surveillance programs.

Elevated serum carcinoembryonic antigen (CEA) is not specifically associated with colorectal cancer, but levels are high in 70% of affected patients. If CEA is high preoperatively, and low after removal of a colon tumour, monitoring CEA may help to detect recurrence.
Treatment and Prognosis

Primary treatment consists of wide surgical resection of the colon cancer and regional lymphatic drainage. The choice of operation for rectal cancer depends on the tumour's distance from the anus and gross extent. Abdominoperineal resection of the rectum requires a permanent sigmoid colostomy. Surgical cure is possible in 70% of patients. The best 5-yr survival rate for cancer limited to the mucosa approaches 90% (stage I, Dukes' A); with penetration of the muscularis propria, 80% (stage II, Dukes' B); with positive lymph nodes, 30% (stage III, Dukes' C).

Medical Certification

Issues dealing with colostomy and ileostomy are found in Section 2.9 Gastroenterology.

Following diagnosis of a bowel cancer, CASA will not usually certificate a pilot or ATC for the first 12 months because of the risk of spread to organs such as the brain, lungs or bone and the associated risk of incapacitation is significant. CASA will require the following information when considering the fitness of a pilot or ATC to return to aviation-related duties following the diagnosis of colorectal cancer: an annual report from the treating gastroenterologist and/or oncologist, including tissue diagnosis, staging and CEA level, for at least 5 years post-diagnosis.

In the absence of recurrence, CASA will usually approve certification as follows:

**Stage I**

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>6 months</td>
</tr>
<tr>
<td>Solo</td>
<td>24 months</td>
</tr>
</tbody>
</table>

**Stage II**

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>12 months</td>
</tr>
<tr>
<td>Solo</td>
<td>36 months</td>
</tr>
<tr>
<td>Class 2</td>
<td></td>
</tr>
<tr>
<td>Solo</td>
<td>12 months</td>
</tr>
</tbody>
</table>
2.14  Malignancy

Stage III

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>24 months</td>
</tr>
<tr>
<td>Solo</td>
<td>648 months</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot</td>
<td>12 months</td>
</tr>
<tr>
<td>Solo</td>
<td>24 months</td>
</tr>
</tbody>
</table>

Non-Hodgkin’s Lymphoma

Non-Hodgkin’s Lymphoma is a malignant monoclonal proliferation of lymphoid cells in sites within the immune system, including lymph nodes, bone marrow, spleen, liver, and gastrointestinal tract. Pathological classification of non-Hodgkin’s lymphomas (NHL) is evolving, reflecting new insights into the cells of origin and the biological bases of these heterogeneous diseases. The course of NHL varies from indolent and initially well tolerated to rapidly fatal.

Incidence and Aetiology

NHL occurs more often than Hodgkin’s disease. Its cause is unknown, although, as with the leukaemias, substantial experimental evidence suggests a viral cause for some lymphomas. Primary CNS involvement and disseminated disease occur. In about 30% of cases, the lymphomas are preceded by generalized lymphadenopathy.

Pathology

The Working Formulation classifies NHL into prognostic categories having therapeutic implications as follows:

- **Low-grade lymphomas** (38%): Diffuse, small lymphocytic; follicular, small-cleaved cell; follicular mixed, small and large cell.

- **Intermediate-grade lymphomas** (40%): Follicular large cell; diffuse, small-cleaved cell; diffuse mixed, small and large cell; diffuse large cell.

- **High-grade lymphomas** (20%): Immunoblastic lymphoma; lymphoblastic lymphoma; small non-cleaved cell lymphoma (Burkitt’s and non-Burkitt’s types).

- **Miscellaneous lymphomas** (2%): Composite lymphomas; mycosis fungoides; true histiocytic; other, and unclassifiable types.
2. Medical Aspects

2.14 Malignancy

**Symptoms and Signs**

Although various clinical manifestations of NHL occur, many patients present with asymptomatic peripheral lymphadenopathy. Enlarged lymph nodes are rubbery and discrete and later become matted. Local disease is apparent in some patients, but most have multiple areas of involvement. Anaemia is initially present in about 33% of patients and eventually develops in most.

**Staging**

Localised NHL does occur, but the disease is disseminated when first recognized in about 90% of follicular lymphomas and 70% of diffuse lymphomas. The final staging of NHL is similar to that of Hodgkin's disease; however, it is more often based on clinical than pathological findings.

### Table 7: Ann Arbor Staging of Hodgkin's Disease and Non-Hodgkin's Lymphoma

<table>
<thead>
<tr>
<th>Stage *</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>In one lymph node only</td>
</tr>
<tr>
<td>II</td>
<td>In two or more lymph nodes on the same side of the diaphragm</td>
</tr>
<tr>
<td>III</td>
<td>In the lymph nodes, spleen, or both and on both sides of the diaphragm</td>
</tr>
<tr>
<td></td>
<td>1 Above the renal vessels (eg, spleen; splenic, hilar, coeliac and portal nodes)</td>
</tr>
<tr>
<td></td>
<td>2 In the lower abdomen (periaortic, pelvic, or inguinal nodes)</td>
</tr>
<tr>
<td>IV</td>
<td>Extranodal involvement (eg, bone marrow, lung, liver)</td>
</tr>
</tbody>
</table>

*Subclassification E indicates extranodal involvement adjacent to an involved lymph node (eg, disease of mediastinal nodes and hilar adenopathy with adjacent lung infiltration is classified as stage II-E). Stages can be further classified by A to indicate the absence; or B to indicate the presence of constitutional symptoms (weight loss, fever, or night sweats). B symptoms generally occur with stages III and IV (20 to 30% of patients).

Initially, constitutional symptoms tend to be less common in NHL than in Hodgkin's disease and do not usually alter prognosis. Organ infiltration is more widespread in NHL, and the bone marrow and peripheral blood may be involved.

**Prognosis and Treatment**

The histopathology, stage of disease, and results of surface marker studies significantly influence the prognosis and response to treatment. Patients with T-cell lymphomas generally have a worse prognosis than those with B-cell types. Other factors that adversely affect prognosis are poor performance status, age >60 years, elevated LDH level, bulky tumour masses (diameter >10 cm), and more than two extranodal sites of disease.

A prognostic index for diffuse mixed, diffuse large cell, and immunoblastic lymphomas has been reported. The International Prognostic Index (IPI) considers five categories: age, performance status, LDH level, number of extranodal sites, and stage. Prognostic groups of low, low intermediate, high intermediate, and high risk may be defined.
2.14 Malignancy

A cure may be expected in 30 to 50% of affected patients with intermediate- and high-grade lymphomas undergoing myeloablative therapy. In low-grade lymphomas, it remains uncertain whether cure may be obtained with transplantation, although their survival rate is better than that of patients receiving secondary palliative therapy alone.

Medical Certification

Without a complete remission, return to aviation duties will not usually be considered. Once in remission, certification will usually be conducted on a case-by-case basis, using Table 9 (see next page) as a guide. The high rate of late recurrence limits the likelihood of an unrestricted Class 1 or Class 3 certification.

Table 8: Outcome According to Risk Group as Defined by the International Prognostic Index

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Patients * (%)</th>
<th>Complete Response (%)</th>
<th>2-Yr Relapse-Free Survival (%)</th>
<th>5-Yr Relapse-Free Survival (%)</th>
<th>2-Yr Survival (%)</th>
<th>5-Yr Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>0 or 1</td>
<td>35</td>
<td>87</td>
<td>79</td>
<td>70</td>
<td>84</td>
</tr>
<tr>
<td>Low - intermediate</td>
<td>2</td>
<td>27</td>
<td>67</td>
<td>66</td>
<td>50</td>
<td>66</td>
</tr>
<tr>
<td>High - intermediate</td>
<td>3</td>
<td>22</td>
<td>55</td>
<td>59</td>
<td>49</td>
<td>54</td>
</tr>
<tr>
<td>High</td>
<td>4 or 5</td>
<td>16</td>
<td>44</td>
<td>58</td>
<td>40</td>
<td>34</td>
</tr>
</tbody>
</table>


A cure may be expected in 30 to 50% of affected patients with intermediate- and high-grade lymphomas undergoing myeloablative therapy. In low-grade lymphomas, it remains uncertain whether cure may be obtained with transplantation, although their survival rate is better than that of patients receiving secondary palliative therapy alone.

Medical Certification

Without a complete remission, return to aviation duties will not usually be considered. Once in remission, certification will usually be conducted on a case-by-case basis, using Table 9 (see next page) as a guide. The high rate of late recurrence limits the likelihood of an unrestricted Class 1 or Class 3 certification.

Table 9: Post-remission certification

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Class 1 &amp; 3 solo</th>
<th>Class 1 &amp; 3 multi-crew/no solo controlling</th>
<th>Class 2 solo</th>
<th>Class 2 as or with co-pilot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>4 years</td>
<td>2 years</td>
<td>2 years</td>
<td>1 year</td>
</tr>
<tr>
<td>Low - intermediate</td>
<td>5 years</td>
<td>2 years</td>
<td>3 years</td>
<td>1 year</td>
</tr>
<tr>
<td>High - intermediate</td>
<td>Certification unlikely</td>
<td>2 years</td>
<td>4 years</td>
<td>2 years</td>
</tr>
<tr>
<td>High</td>
<td>Certification unlikely</td>
<td>2 years</td>
<td>5 years</td>
<td>3 years</td>
</tr>
</tbody>
</table>

Timing is after a complete remission has been obtained.

Applications for renewal of a medical certificate must be accompanied by a progress report from the treating haematologist or oncologists detailing treatment, prognosis and current health. Certification will be for a maximum of 12 months until at least 5 years post-re-certification, and at least 3 years following return to unrestricted duties.
Hodgkin’s Disease

Hodgkin’s Disease is a localised or disseminated malignant proliferation of tumour cells arising from the lymphoreticular system, primarily involving lymph node tissue and bone marrow.

Incidence and Aetiology

Hodgkin’s disease has a bimodal age distribution that peaks at ages 15 to 34 and after age 60. However, the second peak may be an artefact of inaccurate diagnosis, because most cases diagnosed after age 60 are intermediate-grade non-Hodgkin’s lymphomas.

Pathology

Diagnosis depends on identification of Reed-Sternberg cells (large binucleated cells) in lymph nodes or at other sites.

Table 10: Histopathological Subtypes of Hodgkin’s Disease

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance</th>
<th>Incidence</th>
<th>Progression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lymphocyte predominant</td>
<td>Few Reed-Sternberg cells and many lymphocytes</td>
<td>3%</td>
<td>Relatively slow or indolent</td>
</tr>
<tr>
<td>Nodular sclerosis</td>
<td>Dense fibrous tissue surrounds nodules of Hodgkin’s tissue</td>
<td>67%</td>
<td>Intermediate or moderately progressive; relatively slow or indolent (occasionally)</td>
</tr>
<tr>
<td>Mixed cellularity</td>
<td>A moderate number of Reed-Sternberg cells with a mixed background infiltrate</td>
<td>25%</td>
<td>Intermediate or moderately progressive; aggressive</td>
</tr>
<tr>
<td>Lymphocyte-depleted</td>
<td>Numerous Reed-Sternberg cells and extensive fibrosis</td>
<td>5%</td>
<td>Aggressive</td>
</tr>
</tbody>
</table>

Symptoms and Signs

Symptoms and signs primarily relate to the site, amount, and extent of nodal mass involvement. Most patients present with cervical and mediastinal adenopathy and without systemic complaints. Other manifestations develop as the disease spreads through the reticuloendothelial system, generally among contiguous sites. The rate of progression varies according to histopathological subtype.

Diagnosis

Hodgkin's disease can be definitively diagnosed by lymph node biopsy that reveals Reed-Sternberg cells in a characteristic histological setting. Hodgkin's disease may be difficult to differentiate from lymphadenopathy caused by infectious mononucleosis, toxoplasmosis, cytomegalovirus, NHL, or leukaemia.
2.14 Malignancy

Staging
Radiotherapy, chemotherapy, or a combination of both is potentially curative, but the extent or stage of disease must first be determined. The Ann Arbor staging system (see Non-Hodgkin’s Lymphoma) is commonly used.

Treatment
Chemotherapy or radiotherapy regimens cure most patients.

- **Stage I and IIA disease** can be treated with radiotherapy. Such treatment cures about 80% of patients. Cure refers to being disease-free at 5 years post-therapy, after which relapse is very rare.

- For **stage IIIA1 disease**, total nodal irradiation results in an overall survival of 85 to 90%, with disease-free survival of 65 to 75% at 5 years.

- For **stage IIIA2 disease**, combination chemotherapy is generally used with or without radiotherapy of bulky nodal sites. Cure rates of 75 to 80% have been achieved.

- Because radiotherapy alone does not cure **stage IIIB disease**, combination chemotherapy alone or in conjunction with radiotherapy is required. Survival ranges from 70 to 80% (at 5 years).

- For **stage IVA and B disease**, combination chemotherapy has produced a complete remission in 70 to 80% of patients, with >50% remaining disease-free at 10 to 15 years. Patients who fail to achieve complete remission or who relapse within 6 to 12 months have a poor prognosis.

Medical Certification
CASA will not usually consider certification until at least 12 months following successful treatment. “Successful treatment” requires that the disease be in complete remission. Table 11 (below) provides guidance on the likely time before CASA will consider certification, assuming that there are no other significant health issues, no side effects from the treatment and ongoing complete remission or “cure” has been effected. All renewal medical examinations and reports must be accompanied by a progress report from the treating haematologist or oncologist.

**Table 11: Likely certification timings**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Class 1 &amp; 3 solo</th>
<th>Class 1 &amp; 3 multi-crew/no solo controlling</th>
<th>Class 2 solo</th>
<th>Class 2 as or with co-pilot</th>
</tr>
</thead>
<tbody>
<tr>
<td>I and IIA</td>
<td>1 year</td>
<td>6 months</td>
<td>1 year</td>
<td>6 months</td>
</tr>
<tr>
<td>IIIA1</td>
<td>2 years</td>
<td>1 year</td>
<td>2 years</td>
<td>6 months</td>
</tr>
<tr>
<td>IIIA2</td>
<td>3 years</td>
<td>2 years</td>
<td>2 years</td>
<td>1 year</td>
</tr>
<tr>
<td>IIIB and IV</td>
<td>4 years</td>
<td>2 years</td>
<td>3 years</td>
<td>1 year</td>
</tr>
</tbody>
</table>
**Testicular Cancer**

Testicular tumours account for most solid tumours in males aged less than 30 years. Malignant testicular tumours arise from the primordial germ cell and differentiate to reveal seminoma, teratoma, embryonal carcinoma, endodermal sinus tumour (yolk sac tumour), and choriocarcinoma.

**Symptoms, Signs, and Diagnosis**

The usual presenting sign is a scrotal mass, sometimes associated with pain. Many patients discover the mass in association with minor trauma. Haemorrhage into the tumour may produce local pain and tenderness. Any firm mass in the testis is cause for immediate clinical suspicion of testicular tumour. Diagnostic studies should include radioimmunoassays for α-fetoprotein and β-human chorionic gonadotropin. These markers, when elevated, indicate the presence of tumour; they are also valuable in follow-up of patients with proven testicular tumours, especially the non-seminomatous types.

**Prognosis and Treatment**

Prognosis depends on the histology and extent of the tumour. Survival rates are >95% at 5 years for seminomas and non-seminomas localized to the testis or low-volume metastases in the retroperitoneum. The 5-year survival rate for extensive retroperitoneal metastases or pulmonary or other visceral metastases is poorer and varies with site, volume, and histology of the metastases.

Radical (inguinal) orchidectomy, the cornerstone of treatment, provides important histopathological information for planning further therapy. These parameters can accurately predict the risk of occult lymph node metastases; so low-risk patients with normal x-rays and biomarkers may be candidates for surveillance protocols, especially patients with non-seminomatous germ cell tumours rather than seminomas. Otherwise, standard treatment for seminoma is irradiation after unilateral orchidectomy. For non-seminomatous germ cell tumours, standard treatment is retroperitoneal lymph node dissection.

**Medical Certification**

**Stage 1 (non-metastatic disease):**

- *Teratoma with orchidectomy only.* Following recovery from the surgery, unrestricted Class 1, 2 or 3 is usual. For the first 24 months, certification is for 6 months at a time. Each medical is to be accompanied by a report from urologist or oncologist, along with tumour marker levels. Tumour markers will usually rise before any anatomical disease is identifiable. After two years without recurrence, this can increase to 12 monthly certification, until 5 years post-diagnosis.
2.14 Malignancy

- **Seminoma with orchidectomy only.** There is a 15% relapse rate. This is usually monitored by serial CT or MRI scans. Unrestricted Class 1 or 3 certification will be delayed for 24 months post-surgery. Restricted Class 1 and 3 and unrestricted Class 2 is possible from recovery after surgery. Certification will be for 6 months for the first two years, then annual until 5 years post-diagnosis.

- **Seminoma with orchidectomy and radiotherapy.** As the cure rate is greater than 99%, unrestricted Class 1, 2 and 3 certification is possible as soon as the individual has recovered from the primary treatment. Certification again will be for 6 months for the first 2 years, then annual, and the medical must be accompanied by a progress report from the treating urologist or oncologist.

**Stage II/III (local metastatic disease):** The prognosis remains good compared with most other malignancies.

*Table 12: Stage II/III (local metastatic disease)*

<table>
<thead>
<tr>
<th>Class</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1/3 multi-crew/no solo</td>
<td>Following recovery from primary treatment and disease free</td>
</tr>
<tr>
<td>Class 1/3 solo</td>
<td>12 months following successful treatment</td>
</tr>
<tr>
<td>Class 2 as or with co-pilot</td>
<td>Following recovery from primary treatment and disease free</td>
</tr>
<tr>
<td>Class 2 solo</td>
<td>6 months following successful treatment</td>
</tr>
</tbody>
</table>

Renewal medical examinations and reports must be accompanied by a progress report from the treating specialist.

**Stage IV (disseminated disease):** Although 5-year survival is around 60-70%, this outcome is usually achieved only by prolonged chemotherapy. While chemotherapy is required, there will be no certification.

*Table 13: Stage IV (disseminated disease)*

<table>
<thead>
<tr>
<th>Class</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1/3 multi-crew/no solo</td>
<td>24 months following successful treatment</td>
</tr>
<tr>
<td>Class 1/3 solo</td>
<td>Certification unlikely</td>
</tr>
<tr>
<td>Class 2 as or with co-pilot</td>
<td>12 months after last treatment and continued disease free</td>
</tr>
<tr>
<td>Class 2 solo</td>
<td>24 months following successful treatment</td>
</tr>
</tbody>
</table>

Renewal medical examinations and reports must be accompanied by a progress report from the treating specialist.

**Other Malignancies**

This section is not intended to provide detailed advice for all possible malignancies. Other malignancies may be discussed in the relevant organ system section of this Handbook. Otherwise, the guiding principles outlined above should be used. Where doubt exists, discussion with, or referral to, CASA Aviation Medicine Section should be undertaken immediately.
2.15 Differences between Australian Medical Certification and ICAO Medical Certification for International Operations

2.15.1 Currency of Medical Certification

ICAO commences periods of currency from the date of the medical examination, not from the date of CASA's assessment nor from the applicant's anniversary date. As an aide-memoire to applicants, CASA's medical certificates record the date on which the applicant's most recent medical examination was performed, to assist calculation of the medical certificate's currency for ICAO purposes. (See the Note below.)

2.15.2 Duration of Medical Certification

Class 1 medical certificates

For applicants with ATPL who are aged 40 years or more, ICAO demands a medical examination by a DAME every six months. That is, the currency of medical certification for this group extends for only six months from the date of the most recent medical examination.

Class 2 medical certificates

ICAO demands a medical examination by a DAME every two years for all Class 2 medical certificate holders. That is, the currency of medical certification for this group extends for only two years from the date of the most recent medical examination.

As an aide-memoire to applicants, CASA's medical certificates record the date on which the applicant's most recent medical examination was performed, to assist calculation of the medical certificate's currency for ICAO purposes. (See the Note below.)

**Note:** This has no effect on the notified currency of medical certificates when exercising licence privileges within Australian airspace.

This advice is provided to all Class 1 or Class 2 medical certificate holders whenever a CASA medical certificate is issued.
2. Medical Aspects
2.15 Differences between Australian Medical Certification and ICAO Medical Certification for International Operations
3.1.1 Questions to be Asked of CASA Employees for Superannuation Medicals

The following are questions to be asked during Superannuation Medicals (Class 3 Medical Certificate holders and pilots to be employed by CASA).

1. Have you ever been rejected:
   a. As a risk for life insurance?
   b. For admission to any employment for health reasons?
   c. For entry into any superannuation scheme?

2. Have you ever been retired or have your services ever been terminated from any employment on medical or invalidity grounds?

3. Are you receiving, or have you ever received:
   a. A pension or any other benefit from the Commonwealth Superannuation Scheme, the Defence Force Retirement and Death Benefits Scheme, or any other government or private superannuation scheme?
   b. Workers’ or employees’ compensation?
   c. A Social Security invalidity pension or sickness benefit?
   d. A Repatriation service pension?
   e. A Repatriation disability pension? If so, please state award rate.
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4.1.1 Aviation Medicine Telephone Contact as at December 2000

<table>
<thead>
<tr>
<th>Service</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>CASA National Office</td>
<td>131 757</td>
</tr>
<tr>
<td>Inquiries</td>
<td>(02) 6217 1641</td>
</tr>
<tr>
<td>Facsimile</td>
<td>(02) 6217 1640</td>
</tr>
</tbody>
</table>
4.2.1 Head Office

Aviation Medicine Section
Cnr Barry Drive & Northbourne Avenue
CANBERRA ACT 2601
GPO Box 1544
CANBERRA CITY ACT 2601

4.2.2 Area Offices

<table>
<thead>
<tr>
<th>Office</th>
<th>Address</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney Basin</td>
<td>PO Box CPS Condell Park</td>
<td>(02) 97803050</td>
</tr>
<tr>
<td></td>
<td>NSW 2200</td>
<td></td>
</tr>
<tr>
<td>NT and Kimberleys</td>
<td>PO Box 41196 Casuarina</td>
<td>(08) 89432999</td>
</tr>
<tr>
<td></td>
<td>NT 0811</td>
<td></td>
</tr>
<tr>
<td>South Queensland</td>
<td>39 Navigator Place Hendra</td>
<td>(07) 3632 4051</td>
</tr>
<tr>
<td></td>
<td>QLD 4051</td>
<td></td>
</tr>
<tr>
<td>North Queensland</td>
<td>PO Box 7740 Garbutt Qld 4814</td>
<td>(07) 4750 2671</td>
</tr>
<tr>
<td>NSW Country Office</td>
<td>GPO Box 2005 Canberra ACT 2601</td>
<td>131757</td>
</tr>
<tr>
<td>Victoria Tasmania</td>
<td>PO Box 20 Moorabbin VIC 3189</td>
<td>131757</td>
</tr>
<tr>
<td>Central</td>
<td>PO Box 126 PBC Adelaide SA 5950</td>
<td>(08) 8422 2904</td>
</tr>
<tr>
<td>West Australia</td>
<td>GPO Box 1082 CLOVERDALE WA 6105</td>
<td></td>
</tr>
</tbody>
</table>
5. Colour Vision Testing
5.1 Locations for Colour Vision Testing

### 5.1.1 Locations by State

<table>
<thead>
<tr>
<th>Location</th>
<th>Contact Details</th>
</tr>
</thead>
</table>
| **Australian Capital Territory** | Dr D Batagol  
Dickson Park Professional Centre  
Unit 5, Cnr Cowper and Antill Street  
DICKSON ACT 2602  
Tel: (02) 6249 7177 |
| **New South Wales** | School of Optometry  
Ms Kerry Dreyer  
University of New South Wales  
KENSINGTON NSW 2033  
Tel: (02) 9385 4624 or (02) 9385 4628  
Dr P Duke  
135 Macquarie Street  
SYDNEY NSW 2000  
Tel: (02) 9247 3557 |
| **Northern Territory** | Dr M I Mahmood  
Darwin Private Hospital  
Rocklands Drive  
CASUARINA NT 0810  
Tel: (08) 8920 6049 |
| **Queensland** | Optometry Clinic, School Of Optometry  
O Block Kelvin Grove Campus  
Victoria Park Road  
KELVIN GROVE QLD 4059  
Tel: (07) 3864 5739  
Please specify on making an appointment, an "Aviation Colour Vision Test" to be supervised by Miss J Bevan.  
Dr W Talbot  
14 Fulham Rd  
PIMLICO TOWNSVILLE QLD 4812  
Tel: (07) 4775 1633 |
### 5. Colour Vision Testing

#### 5.1 Locations for Colour Vision Testing

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<tr>
<td>Queensland (cont.)</td>
<td>Captain Henry Thein (Northern Ports) Marine Operations, Queensland Transport 64-66 Tingira Street PORTSMITH CAIRNS QLD 4870 Tel: (07) 4052 7400 Fax: (07) 40351127</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ms Wendy Loton</td>
<td></td>
<td></td>
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<tr>
<td>South Australia</td>
<td>Dr J L Crompton 22 Walter Street NORTH ADELAIDE SA 5006 Tel: (08) 8267 3211</td>
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<tr>
<td>Tasmania</td>
<td>Defence Forces Recruiting Medical Section Anglesea Barracks, Davie Street HOBART TAS 7000 Tel: (03) 6237 7327</td>
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<tr>
<td>Victoria</td>
<td>Victorian College of Optometry 374 Cardigan St CARLTON VIC 3053 Tel: (03) 9349 7400 <strong>Note:</strong> Please state “Aviation Colour Vision Test” when making an appointment – to be supervised by Kay Lian Dr J Parkes 54 Station Place SUNSHINE VIC 3020 Tel: (03) 9312 0800</td>
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<tr>
<td>Western Australia</td>
<td>Ms Lisa Biggs Lincoln House Suite No3 No4 Ventnor Avenue WEST PERTH WA 6005 Tel: (08) 9485 1440</td>
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### 6.1.1 List of Forms

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<td>Authority Audiogram</td>
<td>J.S. McMillan</td>
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<td>AVM 005</td>
<td>172</td>
<td>Medical Certificate</td>
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<td>AVM 008</td>
<td>755</td>
<td>Application for Appointment or Reappointment as Designated Aviation Medical Examiner or Designated Aviation Ophthalmologist (under Regulation 6.02 of the Civil Aviation Regulations)</td>
<td>The CASA website</td>
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BODY MASS INDEX CHART

Weight For Height Chart
(For Men and Women from 18 years onward)

Based on Body Mass Index (BMI) in Range of 18, 20, 25, 30.

BMI = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}
## Coronary Heart Disease

### Risk Factor Prediction Chart

1. **Find Points for each Risk Factor**

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<th>Age (if Female)</th>
<th>HDL Cholesterol</th>
<th>Total Cholesterol</th>
<th>Systolic Blood Pres</th>
<th>Other</th>
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<tr>
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<td>Age Pts</td>
<td>HDL-C Pts</td>
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<tr>
<td>30</td>
<td>-12</td>
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<td>55-56</td>
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2. **Sum Points for all Risk Factors**

\[
\text{Age ( ) + (HDL-C ( ) = Total-C ( ) + SBP ( ) + Smoker ( ) + Diabetes ( ) + ECG-LVH ( ) Point Total}
\]

**NOTE:** Minus points subtract from total

3. **Look up risk corresponding to point total**

<table>
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<tr>
<th>Probability (%)</th>
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<td>Age 5yrs 10yrs</td>
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<tr>
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<td>3 3</td>
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<td>28 19    33 30-34</td>
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**Modified from Chart by the American Heart Association, April 2002**
1. Revision History
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

Published by permission of Dr. D.R. Jones from ‘Psychiatric Factors in Civil Aviation Medicine’. David R. Jones, MD, MPH. 10 January 2001. This is extracted from material provided by the FAA’s Civil Aviation Medicine Institute to its Basic Aviation Medical Examiner Course.

1. Clues that may be available before the examination begins:
   - You may know something of the reputation of the applicant in the community.
   - You may learn something from the applicant’s interaction with your office staff.

   Applicants with mental health problems may behave differently with office staff than with the examiner. Consider this if your staff points out behavioural problems or eccentricities.

2. Clues on Medical Certification form:
   - The applicant’s form contains careless or missing marks.
     Obtain the correct or missing data and ask why the mistake was made.
   - The class of certificate desired is not usual for this type of pilot.
     Find out how flying fits into the applicant’s lifestyle and plans.
   - The applicant does not live or work locally.
     Consider the type and stability of the applicant’s occupation.
     Discuss how the applicant came to pick you to do this examination.
   - Previous examinations were not completed.
     Was the applicant learning what to say or not say in order to pass?
   - Previous problems prevented certification (medical or mental health history).
   - Previous experience with health professionals was not adequately explained.
   - Pilot has had personal counselling by mental health professionals or paraprofessionals.
   - Pilot time is unusual or contains unexplained gaps.
     Ask for explanation from a high-time pilot with no date of last examination.
   - Medication history suggests significant illnesses that pilot did not note on the history questionnaire.
     Obtain an adequate history.
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

- Explanations for any medical history or findings do not make sense or seem illogical.

  *Remember Jones’s Rule of Irrational Data:* If you don’t understand what a flier means, assume it’s your problem. Ask again, clearly. If the flier tries hard to explain, you try hard to understand, and you still don’t understand, it’s probably the flier’s problem. Find out what it is. Possibilities include simple misunderstandings, English as a second language, educational deficiencies, cultural differences, limited intelligence, neurological problems, or psychiatric problems.

3. **Clues obtained during the physical examination:**

- Note anything markedly different from what you usually see in pilots: trust your instincts.

- Assess the nature of the applicant’s motivation to fly (Jones, 1986). Err on the side of caution.

  *Watch for applicants who want to be fliers rather than who want to fly.* Some see themselves as alienated from others, or inept, or weak, and wish to acquire the attributes they perceive to be those of fliers: gregarious, competent, and strong.

  *Watch for applicants who want to fly in order to prove fearlessness.*

- Look for scars without explanation obtained by history. Palpate scalp and skull for evidence of old head injury.

  *Watch for applicants whose collection of scars reflects personal recklessness.*

- Watch for applicants who are evasive about surgical scars or head injury scars. Ask about significant loss of consciousness or amnesia if pilot did not report the injury on the 8500-8.

- Observe other pertinent physical factors bearing on mental status (e.g., dress, grooming conduct, alcohol on breath, needle tracks, tattoos that suggest sociopathy, slash scars on wrists, spider nevi, hepatomegaly, blood pressure, heart rate, pupils).

- Talk with applicants before, during, and after the physical examination—inquire about home, work, education, military, or flying. Trust your judgment if you feel uneasy.
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

- Inquire about non-prescription medications, herbal remedies and dietary supplements.

  Such information may be aeromedically significant because of the nature of these remedies, or because of the symptoms for which the pilot feels they are necessary. Taking St. John’s Wort may indicate the presence of depressive symptoms, for instance.

4. What to do when you have finished:

- Ask enough questions to clarify troublesome issues.
- Obtain indicated medical data.
- If anything you encounter raises clinical questions about the applicant’s mental status, or even if you find yourself feeling uncomfortable without knowing exactly why, perform a brief mental status evaluation, using some or all of the items in the Formal Mental Status Examination (MSE) that follows.

  Note that some clinical MSEs, such as the Mini-Mental Status Examination, assess only the Sensorium rather than the entire mental status of a person.

- If you find anything that indicates clinical problems, consider necessary specialty consultations. Again, trust your judgment as an examiner, even if you can’t exactly define what’s wrong.
- Mention equivocal items in “Comments” section of Original or Renewal form for the record, even if you grant the certificate. Your data will be on record if the item arises in future examinations.
- If in doubt, call CASA AVMED for advice.
- If in serious doubt, defer; let CASA decide.
- As a last resort: make a “Don’t quote me” call to the medical authority.
Formal Mental Status Examination

AMSIT (Appearance, Mood, Sensorium, Intelligence, Thought) is adapted from a formulation by David Fuller, MD, as presented in R.L. Leon, MD. Psychiatric Interviewing: A Primer. Ed 2, New York; Elsevier/Science Publishing Co. 1989.

Appearance, Behaviour, and Speech

- **Physical Appearance**: apparent age, sex, and other identifying features. Appearance of being physically ill or in distress; and a careful description of the patient’s dress and behaviour.
- **Manner of Relating to Examiner**: placating, negativistic, seductive; motivation to work with examiner.
- **Psychomotor Activity**: increased or decreased, including jumpiness, jiggling, tapping, looking at watch, etc. Is the person hyperactive or lethargic?
- **Behavioural Evidence of Emotion**: tremulousness, perspiration, tears, clinched fist, turned-down mouth wrinkled brow, etc.
- **Disturbance of Attention**: distractibility, self-absorption.
- **Speech**: description—volume, rate (pressured or slowed), clarity, spontaneity and disturbances—mutism, word salad, perseveration, echolalia, affectation, neologisms, clang speech.

Mood and Affect

**Note**: “Mood is to Affect as Climate is to Weather.”

- **Mood**: use adjectives: mild (it’s there), moderate (it needs treatment), or severe (it needs treatment today!). Consider depression, elation, or other sustained emotions such as anger, fear, or anxiety.
- **Affect**: its range, intensity, lability, and appropriateness to immediate thought. To describe a normal, stable emotional status, say something like “The examinee’s mood is euthymic. Affect is unremarkable in range, intensity, and stability, and is appropriate to material being discussed.”

Sensorium

- **Orientation**: for time, place and situation.
- **Memory**: immediate (digits recall), recent (three items for 10 minutes, current events) and remote (history).
Formal Mental Status Examination

- **Calculating Ability**: serial 7’s, 11 times 13 out loud (valid only if patient is adequately educated).

- **Concentration**: spell *WORLD* backwards, then arrange its letters alphabetically. Repeat with *EARTH*.

**Intellectual Function**

Estimate current level of function as *above average*, *average*, or *below average* based on general fund of information, vocabulary, and complexity of concepts. Do not confuse *intelligence* with *education*. Can the examinee handle abstract ideas, reason by analogy, "make the connection" in conversation? Is the examinee about as smart as the examiner?

**Thought**

- **Coherence**: clear thoughts may be expressed incoherently.

- **Logic**: even clear, grammatical speech may express illogical thoughts.

- **Goal Directedness** (has a point and makes it): tangential or circumstantial thought.

- **Disturbance of Attention**: distractibility (interrupts own sentences), self-absorption.

- **Associations**: loose associations, blocking of obvious ideas or connections, flight of ideas.

- **Perceptions**: hallucinations (false perceptions), illusions, depersonalisation, distortion of body image.

- **Delusions**: false interpretations of real situations.

- **Other Content**: noteworthy memories, thoughts and feelings; suicidal or homicidal intent.

- **Judgement**: formal (specific set-piece situations such as “mailing a letter you find on the street”), social (how examinee behaves with examiner, how he or she “reads” other people—predictable, reasonable, comfortable).

- **Abstracting Ability**: ask pilot to define similarities/differences between *tree-bush, child-midget, king-president, character-personality*. This is more reliable than interpreting proverbs (stitch in time, bird in the hand).

- **Insight**: understanding of any personal dysfunction affecting self or others, and its need for treatment. Insight is *lacking* if there is an unacknowledged problem, *superficial* if it is only acknowledged (“It is a problem.”), *moderate* if it is personalized (“I have a problem”), and *profound* if “It’s my problem, and it’s up to me to fix it.”
1. Revision History
Criteria for the Diagnosis of Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD)

Before a diagnosis of ADD/ADHD can be made, the following criteria (from DSM IV) must be fulfilled:

A. Either (1) or (2):

1. Six (or more) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
   - Often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
   - Often has difficulty sustaining attention in tasks or play activities
   - Often does not seem to listen when spoken to directly
   - Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
   - Often has difficulty organizing tasks and activities
   - Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
   - Often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
   - Is often easily distracted by extraneous stimuli
   - Is often forgetful in daily activities.

2. Six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
   - Hyperactivity
     - Often fidgets with hands or feet or squirms in seat
     - Often leaves seat in classroom or in other situations in which remaining seated is expected
     - Often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
     - Often has difficulty playing or engaging in leisure activities quietly
     - Is often "on the go" or often acts as if "driven by a motor" often talks excessively
   - Impulsivity
     - Often blurts out answers before questions have been completed
     - Often has difficulty awaiting turn
     - Often interrupts or intrudes on others (e.g. butts into conversations or games)
Criteria for the Diagnosis of Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g. at school [or work] and at home).

D. Clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g. Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

Specify Types:

- **Attention-Deficit/Hyperactivity Disorder, Combined Type:** if both Criteria A1 and A2 are met for the past 6 months.

- **Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type:** if Criterion A1 is met but Criterion A2 is not met for the past 6 months.

- **Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type:** if Criterion A2 is met but Criterion A1 is not met for the past 6 months.
**Revision History**

*Note:* The Revision History shows the most recent amendment first. Scroll down the table to view details of previous amendment information.

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<td>Section 2.12</td>
<td>Partly revised to eliminate Australian Hearing Services.</td>
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<td>Section 2.14</td>
<td>Partly revised including all tables and figures.</td>
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<td>Inserted Dr Parkes name and details under ‘Victoria’ (page 2).</td>
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Designated Aviation Medical Examiner's Handbook

VERSION 3.6 : NOVEMBER 2008
## 1. Administrative Aspects

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- 1.1.2 The Origin and Development of the CASA DAME Handbook
- 1.1.3 Appointment and Legal Status of Designated Aviation Medical Examiners (Target Audience of the Handbook)
- 1.1.4 Qualifications and Experience
- 1.1.5 Duration of Designation
- 1.1.6 Duties and responsibilities of DAMEs
- 1.1.7 Duties and Responsibilities of DAOs and DAEEs
- 1.1.8 Facilities and Equipment
- 1.1.9 Powers under the Civil Aviation Regulations
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- 1.2.3 Duration of Validity
- 1.2.4 Special Reports and Tests Required for Medical Certification

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Approved by Assistant Director, Aviation Safety Standards  Version 3.6: November 2008

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**Peak Expiratory Flow in Normal Subjects**
- one A4 sheet
- N/A
- 08/2002

**Coronary Heart Disease Risk Factor Prediction Chart**
- one A4 sheet
- N/A (updated April 2002)
- 04/2002
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1.1 Introduction

1.1.1 Abbreviations Used in this Handbook.

- **ARN**: Aviation Reference Number
- **AMSANZ**: Aviation Medical Society of Australia and New Zealand
- **ASAM**: Australasian Society of Aerospace Medicine
- **AsMA**: Aerospace Medicine Association
- **ATPL**: Airline Transport Pilot Licence
- **CAA**: Civil Aviation Act
- **CAR**: Civil Aviation Regulations
- **CASR**: Civil Aviation Safety Regulations
- **CASA**: Civil Aviation Safety Authority (Australia)
- **DAEE**: Designated Aviation Eye Examiner
- **DAME**: Designated Aviation Medical Examiner
- **DAO**: Designated Aviation Ophthalmologist
- **FAA**: Federal Aviation Administration (US)
- **IAASM**: International Academy of Aviation and Space Medicine
- **ICAO**: International Civil Aviation Organization
- **JAA**: Joint Aviation Authorities (Europe)
- **MRS Online**: Medical Records System Online
- **PMO**: Principal Medical Officer

1.1.2 The Origin and Development of the CASA DAME Handbook

CASA and its antecedent organizations have published advice for DAMEs concerning practical and administrative aspects of their duties for many years. The most comprehensive and semi-permanent repository of such advice has been CASA’s *DAME Handbook*, which originated in the late 1980s. The original hard copy publication was an amalgam of advice derived from many sources. Some of the material can be traced back to directives produced by the Aviation Medicine Branch within the Australian Department of Civil Aviation during the 1950s. A considerable debt is due also to earlier published advice from other Regulators, particularly CAA (New Zealand) and the US FAA.

*The DAME Handbook* was never intended to be completely prescriptive or authoritative, particularly in its more clinically oriented sections. The principal purpose of creating (and maintaining) such a publication is to provide a compact ready reference for DAMEs and anyone else in CASA’s procedures related to aeromedical certification. Soon after *The DAME Handbook* was first published, a need for further explanation and elaboration of its contents became obvious, leading to creation of periodic DAME Newsletters issued by the Director of Aviation Medicine. Jointly, these publications aspired to answer DAMEs’ FAQs and to provide guidance that would reduce errors and facilitate expeditious handling of the medical examinations and reports concerning applicants prepared for CASA.
By 1998, *The DAME Handbook* was showing distinct signs of nearing the end of its useful life. Parts of the *Handbook* had been so qualified and specifically interpreted that it was sometimes difficult for DAMEs and even for staff of CASA Aviation Medicine Section to understand all requirements. Thereafter, an interim revision was produced to remove the more glaring inconsistencies and contradictions that existed between it and some DAME Newsletters. At the same time, CASA had determined that all its future public documents should be created and maintained in electronic format, available on-line, rather than as hard copy. This decision had other major implications, particularly the accessibility of all such documents to unrestricted public scrutiny.

The first on-line version of *The DAME Handbook* was posted on CASA’s website in May 1999. It represented only an interim answer to a continuing need to provide succinct, accessible, relevant advice to DAMEs and other interested persons. At that stage, much of its contents still derived from the reverence accorded to our authoritative forebears, who had not been constrained to reach decisions on evidence-based medicine principles. At least the style was brought into line with modern CASA standards.

The next priority was to review the contents of the system-based chapters in Section 2. This task has continued ever since. CASA intends that this process will continue indefinitely, to ensure relevance and currency of guidance provided. CASA is committed to procedural transparency and to meeting best-practice standards in all of its activities. Aviation Medicine Section’s accelerating, continuous review of *The DAME Handbook* reflects that commitment and will result in the availability of a better, cross-referenced and more practically useful guide.

### 1.1.3 Appointment and Legal Status of Designated Aviation Medical Examiners (Target Audience of the Handbook)

In order to utilise a Flight Crew Licence or Air Traffic Service Licence, it is necessary to have a medical clearance at a standard appropriate to the licence held. Within Australia, designated medical practitioners perform the necessary medical examinations for the Aviation Medicine Section of the Civil Aviation Safety Authority.

Designated medical practitioners perform medical examinations to meet the provisions of the Civil Aviation Act, the Civil Aviation Regulations and the Civil Aviation Safety Regulations. The practitioners approved to perform these examinations are known as Designated Aviation Medical Examiners (DAMEs) or Designated Aviation Ophthalmologists (DAOs). They are responsible to the Principal Medical Officer, who oversees the administration of the DAME and DAO systems.

In order to meet CASA’s needs and the needs of applicants for medical certification, appropriately qualified holders of certain positions are also permitted to undertake the duties of DAMEs and DAOs.
In order to meet CASA’s needs and the needs of applicants who are distant from regular examiners for medical certification, appropriately qualified individual practitioners may also be permitted, as needed, to undertake the duties of DAMEs and DAOs.

Certain optometrists are also approved to perform all those examinations usually carried out by DAOs. These practitioners are known as Designated Aviation Eye Examiners (DAEEs).

To request appointment or reappointment as a DAME, DAO or DAEE, complete a CASA application form (Form 755). Intending applicants may wish first to obtain additional information from one of CASA’s DAME Liaison Officers.

1.1.4 Qualifications and Experience

1. Medical practitioners designated by CASA to perform Air Crew and Air Traffic Services medical examinations must be registered with the medical registration authority of the State or Territory of the Commonwealth or country in which they reside.

2. As a signatory to the Chicago Convention, Australia is bound to appoint as DAMEs only medical examiners that have had appropriate training in aviation medicine. Possession of the Australian Certificate in Civil Aviation Medicine or similar qualification is the normal minimum requirement for appointment as a DAME. A list of courses that CASA will routinely approve for this purpose is available on the CASA website. Applicants for appointment as DAMEs on the basis of completion of other courses should contact CASA’s DAME Liaison Officers to discuss requirements.

Prior to appointment, and periodically thereafter, DAMEs are required to give an undertaking to abide by specified conditions of appointment. This is contained in Form 755.

3. DAMEs are required to attend periodic training seminars or courses in aviation medicine approved by CASA. Routinely approved seminars or courses will be posted on the CASA website. Attendance at an aerospace medicine scientific meeting such as those conducted by ASAM (formerly AMSANZ), AsMA, IAASM, FAA, CASA or similar bodies is sufficient to meet this requirement. DAMEs may also apply individually for approval of other appropriate training activities. Documented attendance at an appropriate activity is usually required at least once every two years.

Because DAOs and DAEEs examine and report only on applicants’ vision, they are encouraged but not required to undertake appropriate training in aviation medicine. However, these practitioners are required to undertake continuing professional education approved by CASA. (CASA will accept evidence of completion of continuing professional education required by an appropriate professional college, association or registration authority as satisfying this requirement).
4. DAMEs resident in Australia are required to effect and maintain membership of the Aviation Medical Society of Australia and New Zealand/the Australasian Society of Aerospace Medicine.

5. DAOs and DAEEs resident in Australia are required to effect and maintain membership/associate membership, as appropriate, of the Aviation Medical Society of Australia and New Zealand/the Australasian Society of Aerospace Medicine.

6. All designated examiners should, as far as possible, be aware of the conditions in which applicants for medical certification are employed or operate. CASA encourages designated examiners to acquire practical experience of these conditions.

7. Designation is usually granted only to practitioners in full-time practice and for one address. Continued designation is subject to the terms set out in the application for appointment in Form 755.

1.1.5 Duration of Designation

CASA appoints DAMEs, DAOs and DAEEs for periods specified at the time of appointment. They are required to re-apply for appointment at the end of each such period.

Designation lapses if the designated examiner ceases to practise at the location for which he/she is appointed, unless CASA approves a changed practice location.

Designation lapses if the designated examiner fails to observe the relevant conditions of appointment as set out in Form 755.

Designation does not automatically extend to a designated examiner’s partners, assistants, locums or successors without prior CASA approval, which should be sought well in advance of any anticipated need. Designated examiners who wish to have other practitioners act in their stead should contact CASA to ascertain precise requirements. For DAMEs’ proposed locums, completion of an approved aviation medicine course is a prerequisite for approval. CASA does not usually approve locum appointments for periods of less than four weeks.
1.1.6 Duties and responsibilities of DAMEs

1. On becoming aware of any condition of potential aeromedical significance in the holder of or applicant for an aviation medical certificate, the DAME must notify CASA of full details within five working days. Note that certain minor conditions (see 1.4.5 Temporary Incapacity of Certificate Holders) need not be reported until the applicant’s next-following routine medical assessment. CASR 67.125 refers.

2. The DAME must be satisfied as to the identity of each applicant for medical certification. Unless the DAME personally knows the applicant, he/she must sight a photographic identity document of the applicant. Subsequently, the DAME is required to certify that he/she has formally identified each applicant. CASR 67.170 refers.

Note: It is prudent to remind applicants, when making appointments, of the need to bring photographic identification to their appointments.

3. The DAME is to answer the medical history questions in the medical assessment report, in conjunction with the applicant, and ensure that the applicant understands each such question.

4. The DAME is to examine personally each applicant presenting for examination, and record the results in the medical assessment report.

5. The DAME is to perform or arrange for any investigations or specialist assessments that are necessary for the examiner to be satisfied that the applicant meets the medical standard for the class of medical certificate sought. See Examiners With Farnsworth Lantern Testing Facilities on the CASA website.

6. The DAME is to comply with CASA’s directions concerning completion and lodgement of medical reports.

7. The DAME is to forward to CASA each medical report or ancillary report received concerning an applicant for medical certification. In usual circumstances, all such reports should be dispatched within 14 days of receipt unless the DAME has contacted CASA and a different schedule has been agreed.

8. The DAME is to ensure that the applicant signs the required statement on completion of the examination. Thereafter, the DAME is to complete his/her details on the statement, and forward it to CASA within the specified period. Under no circumstances should the statement be given to the applicant to dispatch to CASA.
Designated Aviation Medical Examiner's Handbook

1. Administrative Aspects

1.1 Introduction

Approved by Assistant Director, Aviation Safety Standards  Version 3.0: December 2003

9. The DAME is to maintain an up-to-date knowledge of the relevant civil aviation medical standards and techniques required by CASA and by ICAO, and also interpret these requirements for applicants for medical certification. In particular, the DAME is to acknowledge promptly advice from CASA on publication of DAME Newsletters or of changes to the DAME Handbook.

10. The DAME is to notify CASA promptly of any change of address, change of e-mail address, change of telephone number, or absence from practice for periods of four weeks or more.

11. The DAME is to display his/her certificate of appointment as a DAME in his or her professional rooms.

12. The DAME is to return his/her official stamp to CASA on cessation of appointment.

13. The DAME is to use his/her official stamp only for CASA-related purposes. In particular, it should not be used as a means of certifying completion of any medical examinations not required by CASA.

14. CASA requests that DAMEs inform the Authority of details when they learn of the death of any medical certificate holder. (Although this is not a requirement of appointment, such notice is useful for CASA’s monitoring of the health of Australia’s aviation workforce.)

1.1.7 Duties and Responsibilities of DAOs and DAEEs

CASR 67.125

1. On becoming aware of any condition of potential aeromedical significance in the holder of or applicant for an aviation medical certificate, the DAO or DAEE must notify CASA of full details within five working days. Note that certain minor conditions need not be reported until the applicant’s next-following routine medical assessment (see 1.4.5 Temporary Incapacity of Certificate Holders). CASR 67.125 refers.

CASR 67.170

2. The DAO or DAEE must be satisfied as to the identity of each applicant for medical certification. Unless the DAME or DAEE personally knows the applicant, he/she must sight a photographic identity document of the applicant. Subsequently, the DAO or DAEE is required to certify that he/she has formally identified each applicant. CASR 67.170 refers.

**Note:** It is prudent to remind applicants, when making appointments, of the need to bring photographic identification to their appointments

3. The DAO or DAEE is to examine personally each applicant presenting for examination, and record the results in the eye examination report.
4. The DAO or DAEE is to comply with CASA’s directions concerning completion and lodgement of eye examination reports. See Examiners With Farnsworth Lantern Testing Facilities on the CASA website.

5. The DAO or DAEE is to ensure that the applicant signs the required statement on completion of the examination, enter his/her details on the statement, and forward it to CASA within the period specified.

6. The DAO or DAEE is to maintain an up-to-date knowledge of the relevant civil aviation medical standards and techniques required by CASA and by ICAO, and also interpret these requirements for applicants for medical certification. In particular, the DAO or DAEE is to acknowledge promptly advice from CASA on publication of DAME Newsletters or of changes to the DAME Handbook.

7. The DAO or DAEE is to notify CASA promptly of any change of address, change of e-mail address, change of telephone number, or absence from practice for periods of four weeks or more.

8. The DAO or DAEE is required to display his/her certificate of appointment as a DAO or DAEE in his or her professional rooms.

9. The DAO or DAEE is to return his/her official stamp to CASA on cessation of appointment.

10. The DAO or DAEE is to use his/her official stamp for CASA-related purposes only.

1.1.8 Facilities and Equipment

DAMEs are required to provide the facilities and equipment as set out in Form 755 under Conditions of Appointment of DAMEs – paragraph 5.

DAOs and DAEEs are required to provide appropriate facilities and equipment for eye examinations as required by CASA.

1.1.9 Powers under the Civil Aviation Regulations

The Civil Aviation Safety Regulations confer the following powers on DAMEs:

- Extension of the period in force of a current medical certificate, unless it bears the condition ‘Renew by CASA only’. Refer CASR 67.210.
Renewal of the validity of a medical certificate that expired within three months of the examination, unless it bears the condition 'Renew by CASA only'. Refer CASR 67.225.

Direction of an applicant for medical certification to provide or to authorise release by other parties of any information necessary to determine whether the applicant meets the required medical standard for certification. Refer CASR 67.225(3)

Certification of continuing fitness for duty of pregnant air traffic control staff during late pregnancy. Refer CASR 67.235(2).

Certification of return of fitness to exercise privileges of a licence in a medical certificate holder who has been affected by a medically significant condition for a prescribed period. Refer CASR 67.265(4) and CASR 67.270(3)

1.1.10 Responsibilities Under the Civil Aviation Regulations

The Civil Aviation Safety Regulations confer the following responsibilities on DAMEs:

- To comply with any applicable requirements contained in the DAME Handbook
- To observe of the Code of Ethics of the Australian Medical Association
- To attend appropriate continuing education activities relevant to their aviation medicine practice
- To report to CASA within five working days any safety-relevant condition detected in an applicant
- To complete and promptly forward to CASA a Notice/Declaration/Consent/Authorisation: Medical Certification of Applicants form in respect of each applicant examined. Note that part of this process requires the DAME to certify the identity of the applicant.

Further details appear in CASRs 67.060 and 67.170.

The Civil Aviation Safety Regulations confer the following responsibilities on DAOs and DAEEs:

- To comply with any applicable requirements contained in the DAME Handbook.
- To observe of the Code of Ethics of the Australian Medical Association or the Optometrists’ Association Australia, as appropriate.
- To report to CASA within 5 working days any safety-relevant condition detected in an applicant.
When CASA (or a DAME, DAO or DAEE) refers an applicant to a specified medical specialist of its / the referring practitioner’s choice for investigation and / or report, CASA expects that the medical specialist concerned will observe an appropriate, ethical level of professional impartiality. Supreme Court of the ACT Practice Direction No 3 of 2002 (and similar court directives issued in other Australian jurisdictions) provides relevant guidance. If in doubt as to requirements, referring professionals are invited to contact CASA Aviation Medicine Section to discuss the matter.

### 1.1.11 Protection Under the Civil Aviation Regulations

CASR 67.140

Civil Aviation Safety Regulations provide complete indemnification against civil or criminal liability for any medical practitioner or other nominated person or organisation that, in good faith, performs an indemnified act in accordance with the Regulations. Refer CASR 67.140.

For this purpose, ‘an indemnified act’ means any act whereby a DAME, other medical practitioner or other specified person (including a DAEE) advises CASA of any concerns over the ability of a medical certificate holder or applicant to meet a required medical standard for such certification. CASA requires such advice to be provided in writing.

### 1.1.12 Fees

CASA does not set or recommend fees for general DAME, DAO or DAEE examinations.

In the case of CASA employees who are required to hold aviation licences to perform their duties and are thus entitled to reimbursement from CASA for the cost of examinations and any related tests, CASA will reimburse fees determined as reasonable by the CASA PMO. In general, CASA will accept as reasonable, fees that closely approximate the fees recommended in the current edition of the *AMA List of Medical Services & Fees*. Any additional amounts will be the responsibility of the examinee. In cases of doubt or unusual complexity, examiners are invited to discuss the matter with the CASA PMO. Note that CASA will not accept responsibility for any treatment expenses incurred by its employees arising from findings in the course of routine assessments for medical certification.

When presenting for assessment, CASA employees should either present a CASA claim for payment form, with details of where to send it to obtain payment, or personally pay for the consultation and claim reimbursement from CASA. Examiners should not send accounts to Aviation Medicine Section unless this has been previously agreed as the result of a specific request from Aviation Medicine Section.
Where a DAME has been required to expend additional time and effort for a CASA employee in arranging specialist referrals or investigations, obtaining and interpreting copies of reports, or on similar activities, an approach to the CASA PMO for a higher-than-normal fee may be considered.

**Additional Examinations**

Where additional consultations or investigations are necessary to ascertain if an applicant for medical certification meets the required medical standard, the applicant is usually responsible for meeting any costs involved. If such tests are undertaken principally for screening purposes, they will not generally be eligible for rebate from the Health Insurance Commission (HIC). However, if additional tests are required to elucidate a health problem for which medical opinion, investigation or treatment is clinically necessary, these should be rebatable. Affected applicants should be advised to discuss their individual cases with the HIC.

In the case of CASA employees who are required to hold aviation licences to perform their duties and are thus entitled to reimbursement from CASA for the cost of examinations and any related tests, CASA will reimburse fees determined as reasonable by the CASA PMO for additional consultations or investigations necessary to ascertain if the employee meets the required medical standard. In general, CASA will accept as reasonable, fees that closely approximate the fees recommended in the current edition of the *AMA List of Medical Services & Fees*. Any additional amounts will be the responsibility of the examinee. Note that CASA will not accept responsibility for any treatment expenses incurred by its employees arising from findings in the course of routine assessments for medical certification.
1.2.1 Licences – General

Aircrew and air traffic services licences are issued to applicants who have met the relevant technical and theoretical standards. Once a licence is issued, it continues in effect indefinitely. A valid medical certificate appropriate for the class of licence must accompany the licence for the licence holder legally to exercise the privileges of the licence.

1.2.2 Classes of Medical Certificates for Licence Types

There are three medical standards relating to the various types of licences held. These three standards relate to Class 1, 2 and 3 Medical Certificates.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Applicable to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>All professional technical aircrew of powered aircraft, and is required for issue of Airline Transport Pilot Licence, Commercial Pilot Licence, Flight Engineer or Flight Navigator Licences.</td>
</tr>
<tr>
<td>Class 2</td>
<td>Student Pilot, Private Pilot, Commercial Pilot Balloons and Flight Radio Operator Licences.</td>
</tr>
<tr>
<td>Class 3</td>
<td>Air Traffic Control staff.</td>
</tr>
</tbody>
</table>

1.2.3 Duration of Validity

See 1.4.7 Special Periodic Examinations Required.

Unless otherwise advised by the Aviation Medicine Section:

- **Class 1**: Medical Certificate is valid for one year (but see 1.4.7 Special Periodic Examinations Required).
- **Class 2**: Medical Certificate is valid for four years, for applicants less than 40 years of age on the day of issue, and in all other cases for two years.
- **Class 3**: Medical Certificate is valid for two years.

Where an applicant’s medical condition is under review, the duration of Medical Certificate validity may be varied at the discretion of the Principal Medical Officer.
1.2.4 Special Reports and Tests Required for Medical Certification

<table>
<thead>
<tr>
<th>Class</th>
<th>Initial Issue</th>
<th>Renewals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>ECG, audiogram, estimation of fasting serum lipids and fasting blood glucose and examination by CASA Designated Aviation Ophthalmologist.</td>
<td>ECGs are required at the first renewal after the 25th, 30th, 32nd, 34th, 36th, 38th and 40th birthdays, and annually thereafter. Audiograms are required at the first renewal after the 25th birthday and every fifth birthday thereafter. Estimation of fasting serum lipids and of fasting blood glucose is required at the first renewal after the 25th birthday and every fifth birthday thereafter. Examination by CASA Designated Aviation Ophthalmologist at age 60 and at two-yearly intervals thereafter.</td>
</tr>
<tr>
<td>Class 2</td>
<td>Where an applicant for original medical certification has a visual acuity &lt; 6/60 in either eye, an ophthalmic report from an ophthalmologist or optometrist (preferably a DAO or DAEE) is required. There are no other special requirements, except where an examiner determines a clinical indication exists.</td>
<td></td>
</tr>
<tr>
<td>Class 3</td>
<td>ECG, audiogram, estimation of fasting serum lipids and fasting blood glucose and examination by CASA Designated Aviation Ophthalmologist.</td>
<td>ECGs are required at the first renewal after the 25th and 30th birthdays and every two years thereafter, ie, at every subsequent routine examination. Audiograms are required at the first renewal after the 25th birthday and then at each renewal after every fifth successive birthday. Estimation of fasting serum lipids and of fasting blood glucose is required at the first renewal after the 25th birthday and then at each renewal after every fifth successive birthday. Examination by CASA Designated Aviation Ophthalmologist at age 60 and at two-yearly intervals thereafter.</td>
</tr>
</tbody>
</table>

See also section 1.4.1 Electrocardiographs.
1.3.1 General Matters

From 2003, CASA has adopted a medical assessing system intended to automate the process of medical certification to the greatest extent practicable. The technological platform for this process is a computer-based system known as the CASA Medical Records System Online (MRS Online). Intended future development of MRS Online will further improve the speed and accuracy of medical certification.

Once MRS Online became fully operational, CASA decommissioned the former paper-based medical reporting system, which relied on optical scanning to capture and store data from routine medical assessments. CASA no longer maintains a capability to process paper-based routine reports of medical assessments. Consequently, any paper-based medical examination and report forms received are returned to the originator and a notice sent to the examinee advising him/her that the medical report has not been processed and that another is required. Note that further exercise of licence privileges is not permitted until medical certification via MRS Online is complete.

Pending further development of MRS Online, hard copies of applicant statement and examiner certification forms are still required.

CASA continues to accept hard copies of other medical reports, particularly ECGs, because of the time taken to transmit such documents electronically from some computer servers. However, CASA’s preference is for such documents to be scanned and transmitted electronically as attachments to the medical assessment form. In the near future, this will become the only available means for their lodgement.

If, for any reason, an examiner is unable to transmit a medical assessment form to CASA electronically, it is temporarily possible for an examination form to be mailed to the examiner on diskette. Once completed, the diskette can be returned and CASA can then load it manually into MRS Online. CASA does not intend to support this option in the long term because it vitiates many of the efficiency benefits available from MRS Online.

1.3.2 Medical and Ophthalmological Assessment Forms

Prior to undertaking any aeromedical examination, the examiner is to inform each applicant of the possible legal consequences of a deliberate false statement made with the intention of obtaining a medical certificate (see CASR 67). Thereafter, the examiner should obtain the applicant’s signature and complete the applicant statement and examiner certification form and record all relevant historical details obtained from the applicant.
CASA requires that the DAME personally ask the applicant the questions in the medical history section of the medical assessment report, then personally record the answers given. This allows the DAME to assess the applicant’s understanding of the questions and to provide any necessary explanations.

CASA similarly requires that the DAO/DAEE personally ask the applicant the questions in the medical history section of the eye assessment report, and personally record the answers given. This allows the DAO/DAEE to assess the applicant’s understanding of the questions and to provide any necessary explanations.

Slightly different historical data are required from applicants for original medical certification, where fuller details are sought, and from applicants for renewal medical certification. MRS Online automatically generates the appropriate questionnaire for each examination on the basis of its own records and/or input data.

MRS Online automatically generates an original medical history questionnaire whenever a period of 5 years or longer has passed since the applicant’s last medical assessment report.

Where the holder of an existing class 2 medical certificate applies for medical certification at class 1 or 3 level, MRS Online will automatically generate an original medical history questionnaire.

### 1.3.3 The Medical Certificate

Civil Aviation Safety Regulations require an aviation licence holder to have a current, valid medical certificate appropriate to the class of licence held in order to validate the licence holder’s exercise of privileges conferred by the licence. That is, in order to exercise the privileges of an aviation licence, the licence holder must have both a licence and a valid medical certificate for the class of licence.

The medical certificate confirms that the applicant has been medically assessed, details the class of medical certificate held, the validity date, and confirms either that the required medical standard is met or details of any restrictions imposed by CASA which affect the medical certificate’s validity and therefore the use of the licence (refer 1.5.2 Frequently Used Conditions Endorsed on Medical Certificates). For professional licence holders, it also notes the dates of most recent additional examinations required (refer 1.4.6 Additional Investigations and Specialist Opinions).
DAMEs are not authorised to issue interim original medical certificates. Where permitted by Civil Aviation Safety Regulations (see CASR 67.220 and 67.225) they may revalidate an existing current medical certificate or one that has expired for less than three months (see following Section). Legally, every medical certificate is a new medical certificate. The ‘new’ medical certificates issued by DAMEs under provisions of CASR 67.225 actually refer to revalidated medical certificates that have expired for less than three months.
1.3.4 Medical Certificate Revalidation

DAMEs are not permitted to revalidate medical certificates endorsed ‘Renew by CASA only’. Affected applicants are encouraged to return to the DAME for early review, leaving adequate time for CASA to receive the periodic medical assessment and any other required reports and to make a determination on fitness for renewed medical certification.
On completion of the medical assessment, provided that the applicant appears to meet the required medical standard and provided the medical certificate has not been endorsed ‘Renew by CASA only’, the DAME may revalidate an applicant’s medical certificate only, as follows (refer CASR 67.220):

- **If the applicant’s medical certificate has not expired and the assessment is conducted more than 28 days before the expiry date shown on the certificate—for up to two calendar months from the date of the assessment. (But see ‘Exception for ATPL recertification’ below).**

- **If the applicant’s medical certificate has not expired and the assessment is conducted within 28 days preceding the expiry date shown on the certificate—for up to two calendar months beyond the expiry date shown on the certificate.**

- **If the applicant’s medical certificate has expired, and the assessment is conducted within three calendar months of the expiry date shown on the certificate—for up to two calendar months from the date of the assessment.**

To revalidate the medical certificate, the following endorsement is required:

‘Examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (the appropriate date to be inserted is determined according to instructions in the preceding paragraph):

DAME’s signature, date, DAME stamp.

**Note:** Any specialist assessments required in connection with a medical certificate renewal examination need not be performed within 28 days preceding the medical certificate’s expiry date. Guidance on CASA’s usual approach to currency of specialist reports and other investigations appears under 1.8 Frequently Asked Questions.

**Exception for ATPL recertification.**

Some CASA medical standards differ from those required by ICAO (refer Section 2.15). In particular, ATPL holders aged over 40 but under 60 may receive Australian class1 medical certification for 12 months, while ICAO countenances only six months. Because many of this group operate on international routes, CASA advises (and airlines require) that their medical certification is ICAO compliant.
Such applicants will often return for reassessment within the first 6 months of a medical certificate, which is valid for 12 months. In this circumstance, the DAME should endorse the applicant’s medical certificate as follows.

‘Re-examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (this will usually be the date 2 months after the assessment date)
signature, date, DAME stamp

Subsequently, in the usual course of events, CASA will issue a new class 1 medical certificate valid for a further 12 months from the date of assessment. Alternatively, CASA may issue a new medical certificate that has the effect of extending validity for six months longer than the current certificate’s expiry date. This situation will persist while ever the medical certificate holder operates as an ATPL in international air space.

**Note:** There are a number of other differences between CASA and ICAO medical standards. These particularly concern the periods of validity for medical certificates and the frequency of certain routinely required investigations or examinations. Full details likely to be of relevance to Australian examiners will be notified from time to time in *DAME Newsletters*. Those currently of interest are shown in section 2.15 of this manual. For practical purposes, only medical certificate holders who intend to exercise the privileges of licensure in other ICAO contracting states will be affected by these differences.

### 1.3.5 Assessments Other than Pass Assessments

Only CASA’s Principal Medical Officer (PMO) has the delegated power to cancel an applicant’s medical certificate(s).

Only CASA’s PMO and other CASA medical staff have the delegated power to suspend an applicant’s medical certificate(s).

A DAME may only revalidate the medical certificate of an applicant who appears to meet the required medical standard and where the medical certificate does not bear the endorsement ‘Renew by CASA only’. If a DAME has any concerns about an applicant meeting the required medical standard, he/she must decline to revalidate the medical certificate and refer the matter to CASA for determination. Relevant specialist opinions and/or investigations should be obtained and the results forwarded to CASA, together with the DAME’s opinion concerning the applicant’s fitness for certification.
To assist CASA’s consideration of applicants where there is doubt about ability to meet the required medical standard, DAMEs should avoid vague descriptive terms in their reports. Expressions such as ‘brief’, ‘infrequent’, ‘mild’, ‘some’ or similar convey no meaningful information. CASA recommends the “6W mnemonic”.

WHAT 1: What happened? (Detail signs and symptoms that led to the consultation, procedure performed etc).

WHAT 2: What were the sequelae?

WHEN: What were the dates and frequency?

WHERE: What body part was affected? (Left or right, upper arm/forearm etc).

WHY: Why was a procedure performed?

WHO: Who was involved? (Who carried out a procedure/made an assessment/is undertaking follow up, etc).

Once all necessary information has been received, CASA then submits full details of the case to a panel composed of aviation medicine practitioners. When appropriate, this panel may be supplemented by clinical or other specialists. A determination on the case will then be made and the applicant notified of the result.

If an applicant is dissatisfied with the panel’s determination, a review may be requested and/or the matter may be appealed to the Commonwealth Administrative Appeals Tribunal.

### 1.3.6 Identification of CASA Examiners (DAMEs, DAOs and DAEEs)

Each designated examiner (including approved locum examiners) requires an individual Aviation Reference Number (ARN), which must be obtained from CASA – refer Form1162.

CASA issues a unique identification stamp to each DAME. Each stamp carries a state or territory based code (‘A’ for ACT, ‘Q’ for Queensland etc, or ‘I’ for International) plus a three-digit number. Similarly, CASA issues a unique identification stamp to each DAO or DAEE. These also carry an alphanumeric code designating the state or territory plus a restriction limiting examinations to applicants’ eyes (‘SE’ for South Australia, ‘VE’ for Victoria, ‘IE’ for International, etc). Each stamp is intended for the exclusive use of the individual examiner to whom it is issued and, except as provided hereafter, must not be loaned to or used by any other practitioner without prior approval by the CASA PMO.

When CASA has approved a locum to act for a DAME, DAO or DAEE, the locum is to use the appropriate principal examiner’s stamp and also identify himself/herself as a locum in accordance with CASA procedures.
Locums

Locum approval must be obtained in writing from CASA prior to the dates requested. CASA requires a written request including the requested date, the contact details and signature of the proposed locum and the CV of the proposed locum. Once locum approval is gained in writing, the locum is able to perform aviation medical examinations and/or ophthalmological examinations using the existing stamp and writing ‘locum’ next to the stamp within the requested dates.

Locums are viewed the same as DAMEs and DAOs in terms of indemnification, rights and responsibilities. Locums are required to abide by the Conditions of Appointment.

CASA also issues DAME stamps to occupants of certain identified positions who otherwise meet the requirements for appointment as DAMEs (refer CASR 67). These are senior medical positions in the Australian Defence Force (ADF) or Royal Flying Doctor Service (RFDS). Whenever an approved ADF or RFDS medical officer performs a medical assessment under the auspices of one of these identification stamps, details of the individual examiner are also required. Thus it is only possible for ADF or RFDS medical staff who have registered with CASA to perform medical assessments under the auspices of one of these stamps.

The DAME/DAO/DAEE stamp plus the examiner’s ARN must be inserted on all applicant consent and examiner certification forms before their dispatch to CASA, together with signatures of the applicant and of the examiner.

Examiners’ identification stamps should be stored securely when not in use. The unique identification number on each stamp should be used in all correspondence between the examiner and CASA.
1.4.1 Electrocardiographs

Routine electrocardiographs are required at specified intervals for class 1 and class 3 medical certification. They may also be required on clinical grounds (see Section 2.2).

All ECGs sent to CASA are to be mounted on A4 paper and must contain the following information.

- Applicant’s full name
- Applicant’s ARN
- Date of recording.

Leads should be marked on the trace and the calibration mark should be clearly visible. The tracing should be performed using standard calibration (10 mm/mV). If half calibration is needed to clarify the standard trace, both should be sent to CASA. ECGs with slurred or incorrect calibration are not acceptable.

When self-reporting ECG machines are used, the reports are to be included with the tracings.

Where an ECG is known to be abnormal, copies of the previous ECG or reference to it (particularly regarding any changes) would be helpful and should speed CASA’s evaluation of the applicant.

Note that reports (whether by the DAME or other interpreter) should accompany all ECGs sent to CASA. Except for those already reported on by an approved specialist or interpreted by a self-reporting machine, CASA will arrange for a cardiologist to report on all ECGs. This process requires up to a week.

In future, CASA anticipates enabling on-line submission of ECGs via enhanced MRS Online. By then, CASA will likely require that all ECGs are reported on by a self-reporting machine, or interpreted and reported on by a cardiologist, physician or other specialist approved by CASA.

The DAME should also examine all ECGs and assess them as normal or abnormal, then provide details of any abnormality detected in the medical report.

Original issue ECGs performed for class 1 and class 3 applicants should be dispatched to CASA immediately following the examination. The DAME should read, assess and retain any future ECGs performed, except:

- At the first renewal after a class 1 or class 3 applicant’s 25th birthday and at designated intervals thereafter (refer to 1.4.7 ‘Special periodic Medical Examinations Required’), when copies are required for the applicant’s medical record maintained by CASA; and
- Any abnormal ECG must be sent to CASA, together with a cardiologist’s or other specialist’s report as appropriate.
1.4.2 Audiograms

The pure-tone audiogram performed by a DAME or any other person is treated by the Aviation Medicine Section as a screening test only, and is never used as the final arbiter of an applicant's ability to meet the hearing requirements for a Medical Certificate. Audiograms performed by DAMEs are acceptable. However, any audiometer used for CASA-required audiograms must have been calibrated within two years of the date of such examinations.

The audiogram result is to be stated in the medical assessment form even when a printed results slip is included with the form when lodged.

DAMEs should enclose the audiogram result printout with the medical assessment forms for all original Class 1 and Class 3 applicants.

1.4.3 Special Hearing Tests

Where a supplementary speech test is required, this can only be performed by AHS as the calibrated tapes and other equipment required are not available elsewhere. If the applicant fails the speech-based hearing test, in some cases an in-flight test may be offered if he/she has a high level of aeronautical experience. Such an operational check will involve evaluation of relevant aspects of the applicant's hearing by a CASA Flying Operations Inspector or an Authorised Testing Officer with test material transmitted from a control tower. Ideally the test should be conducted in the class of aircraft that is the same as that which the applicant normally operates.

Further information is available from CASA Aviation Medicine Section.

1.4.4 Assessment by Designated Aviation Ophthalmologists or Designated Aviation Eye Examiners

An applicant for original class 1 or class 3 medical certification requires routine assessment and reporting by a DAO or DAEE.

A class 1 applicant who has attained the age of 60 years requires further routine assessment and reporting by a DAO or DAEE. Further assessments are required at intervals of every two years thereafter (refer Section 1.4.7 'Special periodic medical examinations required').

Any applicant for original medical certification who fails to meet the required visual standard also requires assessment and reporting by an ophthalmologist or optometrist, usually a DAO or DAEE. CASA will determine subsequent requirements on a case-by-case basis.
Where a DAME detects or suspects ophthalmic pathology in any applicant for medical certification, referral to a DAO for further assessment is required.

A small number of experienced class 3 medical certificate holders have been ‘grandfathered’ so as to retain their medical certification, despite being unable to meet the colour vision requirements of the class 3 standard.

### 1.4.5 Temporary Incapacity of Certificate Holders

Refer CASR 67.265 and CASR 67.270.

CASA requires medical certificate holders who experience any medically significant changes in medical condition to inform CASA or a DAME of such changes.

The information is required to be conveyed to CASA or a DAME after the applicant has been aware of the change:

- For a class 1 medical certificate holder, for longer than 7 days
- For a class 2 medical certificate holder, for longer than 30 days
- For a class 3 medical certificate holder, for longer than 30 days.

Thereafter, the DAME so informed is required to notify CASA of the matter within 5 working days. Refer CASR 67.125.

A licence holder must not perform any act authorised by the licence while he or she has a medically significant condition which impairs his or her ability to do the act. Before resuming the exercise of privileges under the licence, the licence holder must obtain prior confirmation of fitness from a DAME, as follows:

- For a class 1 licence holder, where the medically significant condition has been present for longer than 7 days
- For a class 2 licence holder, where the medically significant condition has been present for longer than 30 days
- For a class 3 licence holder, where the medically significant condition has been present for longer than 30 days.
A DAME usually need not perform a full medical examination in these circumstances, but should satisfy himself/herself that the applicant has recovered from the illness, injury or other medically significant condition and meets the required medical standard for exercise of the privileges of any licence held. Therefore, a DAME should not issue a medical certificate of the ‘X will be fit for duty from some later date’ —type in anticipation of full recovery sufficient to meet the required medical standard.

Licence holders who fail to observe these requirements may be subject to heavy penalties, so DAMEs should take every opportunity to emphasise these legal requirements to them.

Certain trivial conditions in medical certificate holders need not be reported to CASA unless present at an applicant’s routine medical assessment. However, DAMEs are to advise applicants that these conditions must have resolved fully, without sequelae, prior to applicants resuming the exercise of privileges. Common examples include the following:

- Influenza, coryza, other URTI
- Cough in the absence of wheezing
- Sinusitis
- Occasional, mild headaches
- Uncomplicated urinary tract infection
- Gastroenteritis
- Uncomplicated haemorrhoid(s) if not bleeding and requiring only symptomatic treatment
- Mild allergic rhinitis, if no nasal blockage present and no antihistamine treatment required
- Minor soft tissue injuries without residual pain
- Muscular pain of short duration not requiring long-term medication and not related to any significant underlying chronic illness
- Dysmenorrhoea not requiring medication or absence from work
- Treated chronic fungal nail infections
- Dental extractions.

1.4.6 Additional Investigations and Specialist Opinions

The DAME should refer an applicant (or arrange referral through the applicant’s usual general practitioner) for appropriate specialist review(s) and/or other investigations whenever a significant abnormality in the history or physical examination of an applicant is detected. The purpose of such review or investigation is to clarify whether the applicant meets the required standard(s) for medical certification, or whether medical certification with appropriate conditions is compatible with the safety of air navigation.
Once the DAME has collated all relevant investigations and reports concerning the applicant, these should be sent to CASA, together with the DAME’s own assessment of whether the applicant meets the required standard(s) for medical certification, or whether medical certification with appropriate conditions is compatible with the safety of air navigation.

Where an applicant fails to return for follow up or completion of the assessment is delayed for more than one month for any reason, the DAME should forward to CASA advice of the situation and copies of any reports available. Thereafter, in the event of further delays, or of the applicant failing to return for review, the DAME should advise CASA as then appropriate. Written, faxed or e-mailed advice is required in these circumstances.

**Note:** MRS online will automatically capture incomplete medical examinations and highlight them for CASA’s attention 14 days after the examination has begun. CASA may then contact the DAME for an explanation of the circumstances surrounding the delayed completion of the assessment.
### 1.4.7 Special Periodic Examinations Required

<table>
<thead>
<tr>
<th>Certificate</th>
<th>Frequency</th>
<th>Requirements on Initial Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1 ATPL</td>
<td>12-monthly until age 60, then 6-monthly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
<tr>
<td>Class 1 CPL</td>
<td>12-monthly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
<tr>
<td>Class 2</td>
<td>Four-yearly until age 40, then two-yearly</td>
<td>FEV₁</td>
</tr>
<tr>
<td>Class 3</td>
<td>Two-yearly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV₁</td>
</tr>
</tbody>
</table>

Examinations are as follows:

<table>
<thead>
<tr>
<th>Test</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio</td>
<td>Hearing test — audiogram</td>
</tr>
<tr>
<td>Eye</td>
<td>Specialist eye examination</td>
</tr>
<tr>
<td>ECG</td>
<td>Electrocardiogram</td>
</tr>
<tr>
<td>Serum Lipids</td>
<td>Total Cholesterol (fasting), HDL and LDL fractions</td>
</tr>
<tr>
<td>Blood Glucose</td>
<td>Blood Glucose (fasting)</td>
</tr>
<tr>
<td>Stress ECG</td>
<td>Exercise ECG on Bruce Protocol (no requirement for cardiologist referral)</td>
</tr>
<tr>
<td>FEV₁</td>
<td>Peak Flow (range is within 30% of the predicted value for height, sex and age – refer chart <em>Peak Expiratory Flow in Normal Subjects</em>)</td>
</tr>
</tbody>
</table>

**Notes:**

1. All ECGs performed in connection with medical examinations marked with an asterisk (*) in the ‘Age’ column in the Class 1 and 3 table below are to be forwarded to the Aviation Medicine Section.

2. All abnormal ECGs are to be forwarded to the Aviation Medicine Section with medical assessment forms.

3. Each applicant for a class 1 or class 3 medical certificate who scores 15 or more points on the American Heart Association Coronary Heart Disease Prediction Chart must undergo a stress ECG in accordance with the instructions at Section 2.2.6.
(Notes: Contd)

4 Each applicant for a class 1 or class 3 medical certificate should have his/her risk score calculated at the original medical examination, then at the first medical examination after age 25, thereafter every 5 years until age 60, thereafter annually.

5 Fasting serum lipid estimations must include total cholesterol, high and low density lipoprotein cholesterol fractions: be certain to specify this on the pathology request form as an ‘Occupational Requirement’. (This alerts the pathology laboratory that the investigation is not HIC rebatable and usually ensures it will be performed, even when other lipid values are within normal limits).

6 On occasions, applicants may have undergone certain of these tests or specialist reviews independently of the CASA requirement. CASA will accept certified true copies of recent results (only). Guidance on acceptable recency is contained in Section 1.8, Frequently Asked Questions.
**Classes 1 and 3 Additional Requirements**

The table below gives the additional tests/examinations that are required at each renewal examination for applicants for **Class 1 and 3** Medical Certificates. Requirements for applicants aged more than 80 years will be advised individually.

<table>
<thead>
<tr>
<th>Age</th>
<th>Tests/Examinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>25*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>30*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>30</td>
<td>ECG</td>
</tr>
<tr>
<td>34</td>
<td>ECG</td>
</tr>
<tr>
<td>35</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>36*</td>
<td>ECG</td>
</tr>
<tr>
<td>38</td>
<td>ECG</td>
</tr>
<tr>
<td>40*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td></td>
<td>An ECG is required yearly from age 40 to 80 for Class 1 and every two years for Class 3 (see note 3 (above) re stress ECG)</td>
</tr>
<tr>
<td>45*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>50*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>55*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>60*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>62*</td>
<td>Eye</td>
</tr>
<tr>
<td>64*</td>
<td>Eye</td>
</tr>
<tr>
<td>65*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>66*</td>
<td>Eye</td>
</tr>
<tr>
<td>68*</td>
<td>Eye</td>
</tr>
<tr>
<td>70*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>72*</td>
<td>Eye</td>
</tr>
<tr>
<td>74*</td>
<td>Eye</td>
</tr>
<tr>
<td>75*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>76*</td>
<td>Eye</td>
</tr>
<tr>
<td>78</td>
<td>Eye</td>
</tr>
<tr>
<td>80</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>&gt; 80</td>
<td>Requirements advised individually.</td>
</tr>
</tbody>
</table>
1.4 Special Investigations

1.4.8 Other Special Examinations

Applicants for class 1 or class 2 medical certification who fail the Ishihara Pseudoisochromatic Plates (PIP) colour vision test are to be referred to a centre that conducts Farnsworth Lantern (FALANT) testing. Applicants for class 1 or class 2 medical certification who fail the Farnsworth Lantern tests are to be referred for practical signal light testing. Contact CASA Aviation Medical Section on 131 757 (toll free) or 02 6217 1641 (direct), for details of how to arrange this testing. Note that colour vision testing for these applicants is to follow the sequence PIP → FALANT → practical signal light testing. A pass on any of these tests will satisfy the requirements for issue of an unrestricted class 1 or class 2 medical certificate.

New applicants for class 3 medical certification are required to pass the Ishihara PIP colour vision test. No additional or alternative colour vision testing is available for this group. A small number of experienced class 3 medical certificate holders have been ‘grandfathered’ so as to retain their medical certification, despite being unable to meet the colour vision requirements of the class 3 standard.

For certain applicants, routine periodic urinalysis for drugs is a requirement of continued medical certification. It is medico legally essential that such testing be performed in accordance with a specified protocol. This protocol will be notified in due course.
1.5.1 General

Whenever appropriate, CASA places a condition or conditions of use on an applicant’s medical certificate(s) which influences the validity of the medical certificate(s). Multiple conditions may be placed on a medical certificate, and different conditions may be placed on different classes of medical certificate held by an individual.

1.5.2 Frequently Used Conditions Endorsed on Medical Certificates

<table>
<thead>
<tr>
<th>Endorsement</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renew by CASA only.</td>
<td>The DAME may not revalidate the medical certificate. Any revalidation or renewal is the prerogative of CASA Medical staff</td>
</tr>
<tr>
<td>Visual correction required.</td>
<td>Applicant requires visual correction in order to meet the visual standard. Appropriate correction must be worn when exercising the privileges of the licence. (Class 3 certificates only).</td>
</tr>
<tr>
<td>Assured Visual Correction Required</td>
<td>Applicant requires visual correction in order to meet the visual standard. Appropriate correction must be worn and a spare pair of prescription spectacles must be carried/readily available when exercising the privileges of the licence.</td>
</tr>
<tr>
<td>Near Vision Correction</td>
<td>Applicant requires visual correction in order to meet the near vision standard. Appropriate correction must be readily available and a spare pair of prescription spectacles carried/readily available when exercising the privileges of the licence.</td>
</tr>
<tr>
<td>Not valid for mustering or agricultural flying.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Valid in Australian Airspace only.</td>
<td>This endorsement indicates that the medical certificate is issued despite the holder’s failure to meet a required medical standard, as the safety of air navigation is not adversely affected. Use in any other ICAO contracting state requires specific advance approval by the Regulator for that state.</td>
</tr>
<tr>
<td>Valid in Australian airspace Only, valid up to and Including CPL</td>
<td>Self-explanatory</td>
</tr>
</tbody>
</table>
## Designated Aviation Medical Examiner’s Handbook
### 1. Administrative Aspects
#### 1.5 Medical Certificate Endorsements

**Approved by Assistant Director, Aviation Safety Standards**  
**Version 3.0: December 2003**

<table>
<thead>
<tr>
<th>Endorsement</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not valid for ATPL operations.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Not valid for rotary wing operations.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Special conditions apply</td>
<td>Detailed, individually determined conditions are provided.</td>
</tr>
<tr>
<td>Special conditions apply, Notified in accompanying letter dated dd/mm/yyyy</td>
<td>Detailed, individually determined conditions are set out in the referenced letter, which must be carried with the medical certificate whenever exercising the privileges of the licence.</td>
</tr>
<tr>
<td>Holder to fly as or with a qualified co-pilot.</td>
<td>Refer 1.5.3 Multi-Crew Endorsement</td>
</tr>
<tr>
<td>Holder is required to inform employer of the nature and extent of his/her medical impairment and to co-operate in establishing mitigation strategies to minimise the effect of this impairment</td>
<td>Self-explanatory (Class 3 certificates only).</td>
</tr>
<tr>
<td>Holder may exercise the privileges of the licence without supervision, but there must at all times be another licensed air traffic controller who is aware of the holder’s impairment present and able to assume the holder’s air traffic management duties should the holder experience sudden incapacitation</td>
<td>Self-explanatory (Class 3 certificates only.)</td>
</tr>
</tbody>
</table>
1.5.3 Multi-Crew Endorsement

CASA uses multi-crew endorsements as a means of risk mitigation. Their use enables pilots to continue flying and air traffic control staff to continue duty despite the presence of medically-significant conditions which would otherwise pose an unacceptable risk to the safety of air navigation.

When a class 1 or class 2 medical certificate is endorsed with the condition ‘Holder to fly as or with a qualified co-pilot’, all of the following conditions apply:

1. The holder is restricted to operating either as or with a qualified co-pilot while exercising the privileges of the licence validated by the medical certificate. (Note that it is sometimes possible for an applicant to have an ‘as or with co-pilot’ restriction on a class 1 medical certificate but an unrestricted class 2 medical certificate).

2. Aircraft requirements:
   a. side-by-side seating in the cockpit
   b. fully functioning dual controls.

3. Certificate holder requirements:
   a. to wear shoulder restraint harness at all times
   b. to be prepared to relinquish command or control of the aircraft at the onset of any incapacity
   c. to ensure that the other pilot has read the requirements in this document.

4. Other pilot’s requirements:
   a. to occupy a control seat except for short absences in transport category aircraft in the cruise with the autopilot engaged
   b. to hold command endorsement for the aircraft
   c. to be current and appropriately rated for the flight
   d. to be aware of the type of incapacity the pilot may suffer in flight
   e. to be prepared to take command of the aircraft should the other pilot be unable to continue command.

Note: This condition does not:
   a. Preclude the medical certificate holder from being left on the flight deck alone in a 2-pilot operation; or
   b. limit the medical certificate holder from operating in a 2-pilot operation with another individual who has a medical certificate with this restriction; or
   c. preclude the medical certificate holder from operating as a single pilot on a flight deck should the other pilot in a 2-pilot operation become incapacitated.
When a class 3 medical certificate is endorsed with the condition ‘Holder is required to inform employer of the nature and extent of his/her medical impairment and to co-operate in establishing mitigation strategies to minimise the effect of this impairment’, the following applies:

The holder who has such a restriction on a class 3 medical certificate is required to inform his/her employer of the nature and extent of his/her medical impairment and to co-operate with the employer in establishing strategies to minimise the risk of his/her impairment causing acute incapacitation. Relevant strategies may include, but are not limited to, measures such as special roster or shift arrangements, specified meal breaks, or guaranteed access to prescribed facilities.

When a class 3 medical certificate is endorsed with the condition ‘Holder may exercise the privileges of the licence without supervision, but there must at all times be another licensed air traffic controller who is aware of the holder’s impairment present and able to assume the holder’s air traffic management duties should the holder experience sudden incapacitation’, the following applies:

The holder who has such a restriction on a class 3 medical certificate is not permitted to undertake duty alone and is required to ensure, at the beginning of each shift, that his/her co-workers are aware of the type of incapacity the individual may experience while working and that at least one co-worker is available at all times to take over the individual’s air traffic management duties should such a sudden incapacitation eventuate.
1.6.1 General Matters

Procedures for dispatching routine medical assessment reports to CASA will be detailed in the *MRS Online Program Manual* currently under development.

**Applicant statement and examiner certification forms** should be forwarded to CASA as soon as possible following completion. On receipt, they will be scanned and attached to applicants’ medical files. (Note: CASA intends to develop more efficient alternatives to this procedure in subsequent versions of MRS Online).

ECG recordings, pathology and imaging reports and specialist consultation reports, as hard copies, should be forwarded to CASA as soon as possible following completion or when received by the examiner. Legible scanned copies of such documents may also be sent to CASA as attachments to medical assessment reports submitted online.

Lossy compression graphic formats such as JPEG should not be used because of the loss of information that accompanies the compression process. Do not attempt report scanning unless certain of the properties of the format used. CASA Aviation Medicine Section will provide further advice on request. (Note: CASA intends to develop subsequent versions of MRS Online that facilitate online lodgement of virtually all usually required documents).

Poor quality reproductions of such reports are of no use to CASA and DAMEs will be required to send replacements if MRS is unable to capture a legible image. This problem particularly arises with photocopied documents that are transmitted by facsimile.

Once a medical assessment report is received, the MRS Expert System will automatically determine whether or not the applicant clearly meets the medical standard(s) for the class(es) of medical certificate(s) sought. If the required medical standard is met, an automatic e-mail advice will immediately be dispatched to the originating DAME.

**CASR 67**

On receipt of such e-mail advice, a DAME may revalidate an applicant’s existing medical certificate for the appropriate period specified in the Regulations. Refer **CASR 67**.

**CASR 67**

If, for any reason, a DAME is unable to dispatch a routine medical assessment report immediately following its completion, but considers that an applicant meets the required standard for medical certification, the DAME may then revalidate the applicant’s existing medical certificate for the appropriate period specified in the Regulations. Refer **CASR 67**.
A DAME usually must not revalidate any medical certificate unless:

- e-mail advice from CASA confirms that the applicant meets the required medical standard; or
- he/she is unable immediately to dispatch a routine medical assessment report to CASA, but considers that the applicant meets the required medical standard; and
- the existing medical certificate does not bear the condition ‘Renew by CASA only’.

However, where the holder of a class 1 medical certificate which has been issued for 12 months is an ATPL aged over 40 who requires a medical assessment every 6 months to meet ICAO’s requirements (Refer to Section 2.15), a DAME may revalidate the existing medical certificate in the usual way for 2 months from the date of the examination, even though this period falls within the medical certificate’s continued validity for exercise of privileges in Australian airspace.

In this circumstance, the DAME should endorse the applicant’s medical certificate as follows:

‘Re-examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (this will usually be the date 2 months after the assessment date)

signature, date, DAME stamp

When a medical assessment report indicates that an applicant fails to meet the required standard for medical certification in any particular, the case will then be reviewed by CASA’s clerical assessors and/or medical staff and further advice provided to the applicant, DAME or other examiner as appropriate.
1.7.1 Aviation Reference Number (ARN) Identification

An applicant's Aviation Reference Number (ARN) must accompany all medical reports, ophthalmologists' reports, audiology reports and other specialists' reports and all correspondence concerning applicants sent to Aviation Medicine Section. All applicants should obtain an ARN prior to making an appointment with a DAME, DAO or DAEE for Original assessment. An ARN is required so the DAME or other examiner can connect to CASA's Medical Records System (MRS) to enter the applicant's medical details.

1.7.2 Aviation Reference Number (ARN) Registration

Application for an ARN can be made in person or by post. Application forms are available from the CASA website – refer Form 1162. Alternatively, visit one of the CASA Area Offices to apply in person.
A selection of frequently asked questions and answers to them is given below.

Q. When an applicant has had a required test or consultation independently some time before an equivalent CASA-required examination etc, under what circumstances will CASA accept such an examination in lieu of its own requirement?

A. The results of such external examinations are usually accepted only:
   - where the result/report is credible in all the circumstances;
   - where all parameters which CASA requires to be addressed in the report have been so addressed; and
   - where the reported findings are sufficiently recent to be likely still valid at the time of the applicant’s assessment for medical certification.

Note: CASA will not usually accept ophthalmological or audiometry reports which have not been completed on its own (electronic) stationery, even when these tests were performed for another Regulator, because of slightly different requirements and potential difficulty with interpretation.

Q. When an applicant has had a required test or consultation independently some time before an equivalent CASA-required examination etc, and it appears otherwise acceptable per provisions of the preceding paragraph, for how long will CASA deem such an examination to remain valid in lieu of its own requirement?

A. The usual maximum validity periods for independent routine test reports which CASA will accept are:
   - audiogram: 12 months
   - ECG: 6 months (applicant < 40 years), 3 months (applicant >/= 40 years)
   - fasting blood lipids/glucose estimations: 6 months
   - ophthalmology reports: 6 months

If any results are abnormal or equivocal, repeat studies will be required.

Q. When an applicant has had a clinically-indicated test or consultation independently some time before an equivalent CASA-required examination etc, under what circumstances will CASA accept such an examination in lieu of its own requirement?

A. CASA will deal with each such case on its individual merits. DAMEs and other medical practitioners involved in an applicant’s case management are encouraged to contact medical staff at CASA’s Aviation Medicine Section to discuss individual requirements.
Q. What are CASA’s requirements for medical certification of NZ-qualified pilots who are granted equivalent Australian medical certificates under the terms of the Trans Tasman Mutual Recognition Act (TTMRA)?

A. The TTMRA and the reciprocal NZ legislation apply only to professional licence holders, so effectively concern only Class 1 licence holders. The legislation is completely silent on the issue of medical certification, so CASA and CAA NZ have agreed to deal identically, as follows, with affected pilots whose initial qualifications were gained in the other country but who now have a local licence.

The CAA NZ medical certificate used to validate the original (NZ) licence may be used to validate the newly issued Australian licence until expiry of the NZ medical certificate. (For a class 1 medical certificate, this may permit a validity period of up to 12 months). The relevant authority for this is CAR 5.04 (2).

The licence holder is required to carry the CAA NZ medical certificate when exercising the privileges of the newly issued Australian licence, and also to observe any conditions set out on that medical certificate or in an accompanying letter issued by CAA NZ.

On expiry of the CAA NZ medical certificate, the holder of the licence granted under TTMRA is required to undergo a full CASA ‘Original’ Class 1 medical assessment, including ophthalmology report, audiometry, fasting blood lipid and glucose estimations and resting ECG. As for other Class 1 applicants, a stress ECG should be arranged if indicated. Thereafter, these licence holders will be required to meet identical requirements to all other Class 1 medical certificate holders, including the usual suite of periodically required screening tests.

Q. For how long after blood donation should licence holders/applicants who donate blood refrain from exercising the privileges of an aviation licence?

A. CASA recommends that holders of all classes of medical certificates should usually refrain from exercising privileges of any aviation licence for at least 24 hours after a routine blood donation. In other or unusual circumstances, consultation with a DAME or contact with CASA Aviation Medicine Section is advisable before resuming exercise of privileges.
2. Medical Aspects
2.1 Ophthalmology

2.1.1 Overview

Visual cues provide the pilot's most important sensory input. Good visual acuity over all working distances is essential for safe operation of an aircraft. Information should be sought about the range of visual performance required of each pilot so that relevant advice may be given about suitable correction, if required, and about protection against glare.

If there is any doubt whether a pilot meets the required visual standard, referral to a CASA Designated Aviation Ophthalmologist (DAO) or Designated Aviation Eye Examiner (DAEE) for a detailed assessment and report is mandatory. A standard form has been developed for routine ophthalmological examination required for professional aircrew and ATCs (see also 6. Aviation Medicine Forms). Original examinations must be undertaken by a DAO or DAEE.

Visual Requirements Standard – CASR Part 67

The visual requirements standards are found in the following paragraphs of CASR Part 67:

- CASR 67.150 For medical standard 1
  - CASR 67.150
  - Table 67.150
  - 1.31 – 1.39

- CASR 67.155 For medical standard 2
  - CASR 67.155
  - Table 67.155
  - 2.31 – 2.39

- CASR 67.160 For medical standard 3
  - CASR 67.160
  - Table 67.160
  - 3.29 – 3.37
2.1.2 General Visual Requirements

The Medical Standards in the Civil Aviation Safety Regulations (CASRs) stipulate that the functions of the eyes and their adnexae shall be normal. This requirement encompasses more than simply visual acuity. All Designated Aviation Medical Examiners (DAMEs) and Designated Aviation Ophthalmologists (DAOs) and Designated Aviation Eye Examiners (DAAEs) must satisfy themselves that this criterion has been fulfilled before assessing a pilot as meeting the required visual standard.

All applicants for initial issue of a Class 1 and/or 3 Certificate must be seen by a DAO or DAAE. All applicants for issue of a Class 1 and/or 3 Certificate must be seen by a DAO or DAAE at the time of first renewal of medical certificate after reaching the age of 60 years and at two-yearly intervals thereafter.

2.1.3 Refractive Error

Some degree of refractive error is found in the majority of eyes. Most of these errors are simple and are due to a slight lack of coordination of development of the various parts of the refractive system. They represent, therefore, a biological variation from the norm and should not be regarded as pathological.

Pathological refractive errors are relatively uncommon. They are due to gross developmental abnormality. The degree of error is usually high and the visual acuity is often not fully correctable while, particularly in myopia, the eye may show degenerative changes.

At birth, the majority of eyes are hypermetropic. From then until the age of eight years, this hypermetropia is seen to increase. After age eight, refraction becomes less hypermetropic (or more myopic) until approximately the age of 25 to 30 years, when relative stability is reached.
If, therefore, a young applicant has had less than the average degree of hypermetropia at birth, the natural shift to the more myopic side can result in the development of overt myopia, a development that is likely to progress until the age of 25 to 30 years, when some degree of stability is reached.

It is difficult to give an accurate prognosis of the progress of refractive errors since individuals do not necessarily conform to the population norm, and those who develop frank myopia frequently progress to the myopic side more rapidly than those who remain on the hypermetropic side of the population norm.

CASA has not placed restrictions on applicants who require high levels of correction in order to meet the required visual standards. CASA considers that ability to meet the standard is all that is required, regardless of the power of corrective lenses necessary to achieve this outcome.
2.1.4 Refractive Surgery

Radial Keratotomy (RK)

The role of radial keratotomy in reducing refractive errors is a significant current issue in aviation medicine. Persons who have undergone this procedure are often subject to diurnal fluctuation in visual acuity. If this is significant, (i.e. loss of more than one Snellen line for professional licence applicants and more than two Snellen lines for private licence applicants) even if an applicant’s visual acuity is still within the pass standard, this fluctuation constitutes failure to meet the visual requirements of the standard(s) concerned.

Applicants who undergo radial keratotomy before their myopia has stabilised are at risk of continuing progression of their myopia.

The long-term consequences of radial keratotomy are not yet well documented, so it is impossible to predict any long-term implications for pilot licensing. Applicants should be reminded of this uncertainty as it may affect their chances of employment in the aviation industry.

Following radial keratotomy, the refraction takes some time to stabilise to its new value. Flying is not permitted while the refraction is still plastic. Evidence of stability requires:

- A variation not exceeding 0.25 dioptres in refraction
- A visual acuity changing by not more than one Snellen line
- Visual acuity, which at least satisfies the minimum standard for the class of licence, at three paired serial measurements.

These three paired serial measurements are to be part of a full ophthalmological examination, are to include measurements early in the morning and late in the day, and must be delayed for at least three months following surgery. Note that some eyes may not have stabilised even as late as a year after surgery.

A second problem associated with radial keratotomy is sensitivity to glare. This can cause considerable difficulty in the healing phase but tends to settle with time. Testing of visual performance with a bright light shining at the applicant should demonstrate any continuing glare sensitivity.

All applicants whose eyes have stabilised following radial keratotomy must thereafter have an ophthalmological assessment every two years for Class 1 and 3 and every five years for Class 2 Medical Certificates.
Photo-ablative Refractive Keratectomy (PRK)

This is a new technique, using a laser, for changing refraction. The long-term implications are as yet unknown. The requirements for assessing stability after radial keratectomy outlined above should be followed after photo-ablative refractive keratectomy.

2.1.5 Monocular Pilots

Monocular pilots may be divided into two categories:

- The monocular condition—the situation in which an applicant has only one functioning eye.
- The functionally monocular condition—the situation in which an applicant has two eyes, but the visual acuity of one cannot be corrected to 6/9 or better.

Provided the visual acuity requirements can be met in the functioning eye, with or without correction, a waiver is granted for Class 2 certification, limited to Australian Airspace, for both the monocular condition and for functionally monocular pilots. Likely Conditions on an applicant’s Medical Certificate are:

- Not valid for mustering or agricultural flying.
- Valid in Australian airspace only.
- Special conditions apply.

Functionally monocular pilots who can meet the visual acuity standard with the remaining eye may obtain Class 1 certification. These applicants are required to show that flight safety is not jeopardised by the reduced visual acuity or absence of the other eye. Only the Aviation Medicine Section can issue this waiver. Likely Conditions on the resulting Medical Certificates are as set out above for Class 2 Medical Certificates.
2.1.6 Visual Acuity

**Distant Vision**

Record the uncorrected distant visual acuity in each eye separately, also binocular acuity. If the applicant wears correcting lenses, record the corrected acuity also for each eye and binocularly. For original examinations, check visual acuity without contact lenses and then with contact lenses. Acceptable values are as follows.

**Student and Private Pilots**

For students and private pilots, acceptable values are at least 6/12, corrected if necessary, in each eye. An acuity of at least 6/9 (with or without correction) with both eyes open is also required.

If the student or private pilot applicant cannot achieve 6/12 (with or without correction) in each eye, the DAME should inquire about the defective eye and record the cause.

In cases of doubt, referral to a CASA Designated Aviation Ophthalmologist or prescribing optician is indicated. These applicants may be acceptable for non-commercial licences; however, their licences will carry endorsements restricting operations to Australia.

By definition, if an applicant achieves no better than 6/12 in the poorer eye, the applicant is considered to be functionally monocular.

Applicants assessed as suitable for licensing with appropriate endorsements are required to have a stable visual condition to which they have adjusted. This provision affects pilots who have poor foveal static visual acuity but whose peripheral vision is normal (in practice, amblyopia). Those who have completely lost an eye or its vision may be assessed as fit after the Aviation Medicine Section’s consideration of such factors as the extent of visual field loss and the duration of the condition.

**Professional Flight Crew and ATCs**

For all professional flight crew and ATCs: 6/9, corrected if necessary, in each eye separately. Additionally, the acuity must be 6/6 or better when tested with both eyes open.

Applicants with high refractive corrections (i.e. greater than +/-5 dioptres) should be advised of the possible complications, which may affect their vision, and of the implications for their aviation careers, particularly their increased statistical chance of retinal detachment.

**Note** The equivalent spherical error is taken as the sum of sphere power plus half that of the cylinder, the calculation taking account of arithmetical signs.
The High Myope

CASA prescribes no limit and high myopes who meet the standard after correction are assessed as meeting the standard. The final decision in cases of high myopia depends on the applicant’s functional visual ability and on the absence of significant ocular pathology.

Although high-density lens material has enabled the lenses in corrective spectacles for applicants with high myopia to be thinner and so not cause unacceptable peripheral distortion, contact lenses are the preferred method of visual correction for myopes who require more than 5 dioptres of correction.

Near Vision

Near vision at all ages must meet the standards specified in the CAR Schedule (N5 with or without correction at 30-50cm and N14 at one metre without correction). DAMEs must check this function at every periodic medical examination for all applicants for aviation licensing.

Professional flight crew should be advised to have periodic ophthalmological examinations from age 45 to detect early signs of developing ocular pathology.

If an applicant cannot meet the standard, he or she should be referred for an ophthalmological assessment and appropriate spectacles prescription.

Near-vision spectacles have a limited range of clear vision, which depends on the power of the lenses prescribed and on the residual accommodation of the wearer.

It is vitally important that the range of clear vision encompasses all the near objects that need to be seen clearly. Typically this ranges from the reading of maps and operating manuals at ordinary reading distance to reading the more distant parts of the instrument display at a distance of one metre or more.

It is important that the spectacles prescribed are suited to the near working distances imposed on the pilot by the configuration of the flight deck of the aircraft. This becomes increasingly critical as an applicant’s presbyopia progresses with age.

The pilot should measure the working distances encountered in all seating positions on the flight deck, and record them prior to having a prescription for near vision determined. A suggested checklist for pilots is as follows.
2.1.7 Working Distances Checklist

<table>
<thead>
<tr>
<th>Object</th>
<th>Nearest (cm)</th>
<th>Farthest (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flight instruments</td>
<td></td>
<td></td>
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<tr>
<td>Engine instruments</td>
<td></td>
<td></td>
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<tr>
<td>Checklists</td>
<td></td>
<td></td>
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<tr>
<td>Electronic Flight Instrument Systems</td>
<td></td>
<td></td>
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<tr>
<td>(EFIS) and flight management display</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach charts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General charts and manuals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Overhead Panels

Overhead panels can cause difficulty because of their close proximity to the pilot’s eyes. This proximity ensures that the presbyopic pilot has difficulty seeing legends and numerals clearly, yet in order to view through the near segment of bifocals or through look-overs it is necessary to tilt the head back awkwardly. This may present particular difficulty in some aircraft types.

Possible solutions to difficulty in viewing overhead panels:

- The simplest solution is to lift the bifocals (or look-overs) so that the head does not have to be tilted so far back.
- Flip-down spectacles can be provided with an additional lens power to focus the overhead panel clearly when viewing through the upper distance part of the bifocal lens.
  However, flip-downs are cumbersome and there is a risk that they may be left down, causing blurring of distance vision. There is also a risk that they may flip down inadvertently as a result of turbulence during some critical phase of flight.
- There are vocational multifocals available which have a near segment in the upper part of the lenses as well as in the lower part. However, the distance portion between the two segments is only 12 or 15mm deep giving a distant vertical field of view of only 21 to 26 degrees. Pilots may find this impedes their visual scanning.
- A special multifocal lens can be constructed to provide a small near viewing segment in one corner of the upper part of the lens.
The more complex solution should usually only be pursued if pilots experience significant and persistent problems with the overhead panel. The overhead panel usually does not demand perfect visual acuity and is not often used in critical phases of flight, so it should not be assumed that it presents serious operational difficulties.
2.1.8 Bifocal Segment Height

The height can be set so that the pilot views the instrument panel through the near segment as well as using it for charts and manuals at an ordinary reading distance.

Alternatively the segment can be set low so that it is used only for charts, manuals and reading. When viewing the instrument panel the pilot will look over the top of the near segment to use the distance part of the bifocal.

This choice will depend on:

- Whether or not the pilot is having any difficulty reading instruments on the forward instrument panel; and
- The pilot’s residual accommodation. (At least 2.75 to 3.50D of accommodation is required to see the instrument panel clearly and comfortably through the distance part of the bifocals.)

If the segment is set low, the bifocals may not be suitable for everyday reading outside the aircraft. A separate pair of reading glasses of bifocals for everyday use may then be required.

How to Determine the Correct Segment Height

Optometrists and spectacle dispensers are skilled at setting the segment height correctly, but flying is a demanding occupation and it is worth taking pains to obtain an accurate prescription for the height of the near segment.

It is worth checking segment height on chosen frames or single lens distant vision glasses by stretching adhesive tape across the frame or lens whilst the pilot is seated in the cockpit. The position of the tape can be varied until its upper edge is at the height desired for the top of the near vision segment.
2.1.9 The Need for Trifocals

As presbyopia advances, the power of the near spectacle correction must be increased to compensate for further loss of accommodation power. As a result, the range of clear vision decreases.

For a pilot aged about 45 with 3.50D of residual accommodation, the power of the near addition typically prescribed is 1.00D. For this person, the range of clear vision is from two metres to 220mm, which should be more than adequate for all flight deck near-vision tasks. However, a pilot aged 50 to 55 with only 1.50D of residual accommodation is typically prescribed a near addition of 1.75D, giving a very much smaller range of clear vision from 800mm to 360mm. This range is suitable for near tasks at ordinary reading distances but does not permit clear vision of those parts of the instrument panel beyond 800mm.

When this occurs, trifocals are required. Trifocals provide an intermediate segment that has approximately half the power of the lower near segment.

2.1.10 Acceptable Forms of Correction

To comply with operational requirements, reading correction must be in the form of ‘look-overs’, bifocal or trifocal lenses as appropriate. Single vision lenses for near correction are not acceptable. See the diagram below.

- Bifocal Lens: For reading
- Look-over Lens: For reading
- Single Vision Lens: Whole lens for reading NOT suitable for flying
2.1.11 Progressive Power Lenses

These lenses provide a variable focus depending on which part of the lens is used for viewing. They provide a narrow intermediate visual channel and larger distant and near areas. These lenses may be associated with illusions of movement and distortion in the peripheral field of view. They should only be used for flying after adaptation in flight as a non-critical crewmember.

2.1.12 Contact Lenses

Provided the following criteria are met, contact lenses may be worn for correction of distance vision.

Both hard and soft contact acuity lenses are acceptable. The pilot must be able to wear the lenses throughout an ordinary day without experiencing any discomfort or deterioration of vision.

An acuity of 6/9 in each eye is required with correcting spectacles immediately after removal or displacement of contact lenses.

The pilot and the prescriber are responsible for ensuring that the pilot has adapted to the contact lenses sufficiently to perform his or her aviation duties. The duty period depends on the type of operations in which the pilot is engaged. The length of time that contact lenses can be worn without producing discomfort differs for private/pleasure flying and long haul commercial operations.

The choice of lens depends upon the nature of the correction required and on cabin conditions encountered.

Hard lenses tend to induce more discomfort and can be displaced by propeller wash or strong wind. Should a pilot need to remove the lenses in flight and substitute spectacles, post-wearing blur with decreased visual acuity should be anticipated.

Soft lenses do not cause those problems to the same extent. However, they may not fully correct astigmatism of greater than one dioptre.

For high myopes, soft contact lenses are preferable to spectacles. In the greatest degrees of myopia, the required visual acuity standards may not be able to be met using spectacles.

For initial issue examination, the contact lenses should be removed and the applicant’s visual acuity checked while wearing spectacles. The uncorrected vision should also be recorded. At renewal medical examinations it is not necessary for the applicant to remove the contact lenses unless the examiner considers this clinically indicated.
2.1.13 Sunglasses

Glare is often a cause of significant discomfort when flying above cloud or when flying into the sun. Sunglasses may be required in such circumstances.

There are two basic factors to consider when selecting sunglasses, namely the frame and the lenses.

Any spectacle frame reduces the field of vision. Narrow frames that carry large lenses are desirable. The most critical problem with frames arises from the presence of wide side-arms which significantly impair the peripheral visual field.

Sunglass lenses should protect the eyes from glare while not adversely affecting the visual cues necessary for safe flight. Accordingly, lenses should not be too dark, and should transmit at least 15% of incident light. The tint used should be "neutral density" (N.D.), that is, a greyish tint that does not distort colour perception or adversely affect red signal detection and recognition. The recommended tint is N.D.15.

Lenses of polycarbonate are preferred because of their impact-resistance and ability to absorb ultra-violet and infrared rays. However, these lenses can scratch readily and any scratched spectacles should be discarded.

To ensure that sunglasses provide adequate protection from solar radiation that may damage the eyes, only those sunglasses that conform to the current Australian Standard should be worn.

Sunglasses that conform to the current Australian Standard also meet acceptable standards for lens quality, frame strength and lens retention.

For aviation use, those sunglasses marked "Specific Purpose Sunglasses" are recommended, provided their frames are appropriate. The lenses of these sunglasses have been specifically designed for use in conditions of intense glare, such as in flight above cloud. At high altitude, atmospheric absorption of ultra-violet radiation is reduced.

Polarising sunglasses should not be used when flying. The polarising filter interacts with the cockpit transparency to produce a distorted and degraded visual field that poses a threat to air safety.

The pilot who already wears prescription spectacles for flying can choose from a number of options for glare protection. Prescription sunglasses with N.D.15 lenses can be obtained, or N.D.15 clip-on or flip-up sunglasses may be worn over prescription spectacles.

Pilots who require correction of their near vision only and who wear "look-overs" are advised to obtain bifocals and a plano upper segment. Clip-on or flip-up sunglasses can then be worn. However, the dangers of flip-ups previously mentioned should be recalled.
2.1.14 Photochromics

Spectacles can also be prescribed with photochromic lenses — lenses that change their density depending on the ambient light level. Under bright conditions they are like sunglasses, while in darker conditions they transmit light almost as well as untinted lenses. However, photochromic lenses have disadvantages that render them unsuitable for use by pilots.

Firstly, their transition times are relatively slow. Photochromic lenses take about five minutes to increase their density to the level of sunglasses, but more importantly, the bleaching time from maximum to minimum density can be as long as 30 minutes or more, although there is a rapid lightening of the lens in the first five minutes. This may be too long when there is a sudden variation in light during a descent into or under cloud, or because of a rapid change in cloud cover.

Their second disadvantage is that, even when fully bleached, photochromic lenses still absorb slightly more light than untinted lenses. Since vision is critically dependent on ambient light levels at night or otherwise when light levels are low, even this small decrease of light reaching the eye through photochromic lenses is undesirable. The inherent degradation of these lenses with time effectively prohibits their use in flying or controlling air traffic and applicants should not use them in these circumstances.
2.1.15 Colour Vision

Normal colour perception is becoming increasingly important as colour-coded cathode ray tube displays and colour coded visual approach lights become more prevalent. If any element of doubt exists about a pilot's ability to perceive colour normally, the case should be referred to the Aviation Medicine Section.

Commoner Types of Colour Vision Defects

<table>
<thead>
<tr>
<th>Type (Incidence)</th>
<th>Essential Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protanomaly (1.0%)</td>
<td>Colour matches are different from those made by normals (anomalous colour matching). Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Extreme protanomaly (0.2%)</td>
<td>Reduced colour discrimination for red, yellow and green. Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Protanopia (1.0%)</td>
<td>Confusion of red, yellow and green. Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Deuteranomaly (4.5%)</td>
<td>Colour matches different from those made by normals.</td>
</tr>
<tr>
<td>Extreme deuteranomaly (0.5%)</td>
<td>Reduced colour discrimination for red, yellow and green.</td>
</tr>
<tr>
<td>Deuteranopia (1.5%)</td>
<td>Confusion of red, yellow and green.</td>
</tr>
</tbody>
</table>

Test Procedure

The DAME is required to conduct a colour perception test, using the Ishihara 24-plate test. This test should be conducted even if the applicant is to be referred to an ophthalmologist. If the applicant should incorrectly identify more than two of the Ishihara plates, a test on a Farnsworth lantern is needed to determine whether or not he or she meets the colour perception standard.

The Ishihara plates test should detect all red/green colour vision defectives. Examiners should be aware, however, that some applicants may have learned the plates, and their presentation in random order is important. Other applicants have been trained to identify numbers on the plates by means of brightness cues or may even attempt to pass the plate tests by wearing an X-chrom or similar lens—a red contact lens worn in one eye which improves the colour defective's performance on the test.
Plate Testing

Reliable colour vision testing using the pseudoisochromatic plates requires that a standardised procedure be followed carefully. The main points are:

Illumination

Only the following are permitted:

- Daylight (but not direct sunlight). This is preferred.
- Fluorescent light from a fluorescent tube of 6,500 degree K colour temperature (normal daylight tubes).
- Phillips ‘Bleu’ incandescent lamp.
- Macbeth Colour Source C.
- Where an applicant is unable to pass the test when it is performed under artificial lighting conditions, it should be repeated in daylight before a failure is recorded. However, this additional test is not required where an applicant makes more than 12 errors or gives a history of known defective colour vision.

Note: Before using fluorescent light, check the maker's label on the end of the tube to ensure the colour temperature is that specified. Tubes labelled "warm white" or "soft white" are not suitable.

Position

The applicant may stand or be seated, but should look squarely at the test plates from about 75cm distance. The applicant’s position should be adjusted so that no specular reflection from the glossy surface of the plates is observed. The applicant should not move his or her head while taking the test.

Exposure Time

Each plate is exposed for a maximum of five seconds.

Procedure In Detail

1. Check the applicant’s position, illumination, watch or clock with second hand.
2. Open the book at the first (demonstration) plate.
3. Read out at conversational speed, pausing perceptibly where indicated.
   “I am going to show you some pages of dots. On some of them you can see a number, but some have no number. I want you to tell me if you can see a number and what it is. (Pause.)

   If you can't see a number, say "no number". You have up to five seconds for each page. (Pause)

   Is that clear?”

4. Now expose each test plate in random sequence.

5. When the applicant responds, or after five seconds have elapsed, whichever is sooner, turn to the next plate. Most applicants respond almost at once.

6. If more than one response is given to a plate, eg, "It's either three or eight", say "which one are you going to choose?" If the applicant changes his or her response, record the second response.

Marking Standard

Applicants scoring two errors or less on the 24-plate edition of the Ishihara plates meet the required standard. Those making three or more errors need to be tested on the Farnsworth Lantern.

Note: If the DAME suspects that a filter aid is being used, each of the applicant’s eyes is to be tested separately and then binocularly. The results are to be notified to the Aviation Medicine Section.

Further Testing

Some applicants with defective colour vision may be safe for aviation duties, e.g. mild deuteranomals. The Farnsworth Lantern passes these while failing all protanopes and deuteranopes and most protanomals and the more severe deuteranomals.

The Australian locations of Farnsworth Lanterns are listed in 5. Colour Vision Testing. Farnsworth Lanterns are not transported to outlying areas. Examiners should refer applicants who fail the plate test directly to the nominated centres for Lantern testing. Such referrals should be noted on the examination form. If there is no record of such referral on the form, the Aviation Medicine Section notifies applicants of their right to undergo further testing.

Note: Applicants for original class 3 medical certification must pass the Ishihara Plate Test.
An applicant who fails to meet the colour perception standard (i.e. who fails both the Ishihara Plate Test and the Farnsworth Lantern, but who meets all other standards) is eligible for issue of an operationally restricted student pilot, private pilot or commercial pilot licence. The holder of such a licence is given a dispensation to operate at night in a suitably radio-equipped aircraft. This dispensation applies to Australian airspace only.

Class 1 and class 2 applicants who are unable to pass either the Ishihara Plate Test or Farnsworth Lantern Test may be further assessed by means of Practical Signal Light Test. Details are available from Aviation Medicine Section.

### 2.1.16 Cataract

Applicants who have undergone cataract extraction(s) and who achieve acceptable visual acuity with lens implant and/or contact lenses may be passed at all licence levels following individual assessment by the Aviation Medicine Section. Full reports are required.

All other cases of cataract should be referred to an ophthalmologist. A report including assessment and prognosis is required. The final decision in these cases is based on the ophthalmology report.
2.1.17 Demyelinating Disease

Multiple Sclerosis (MS) is a central demyelinating disease involving multifocal demyelination of white matter, which initially affects young people under 40 years of age. The diagnosis requires multiple attacks of demyelination separated in time and locations. A thorough neurological history is important at the time of presentation. Nuclear magnetic resonance imaging (MRI) offers some help in diagnosis but should not be substituted for good history taking.

The most common ocular manifestation of MS is optic neuritis. It is the presenting feature in 25% of cases and occurs during the course of established disease in 70%. Between 50% and 70% of patients in the 20 - 40 year age group presenting with optic neuritis subsequently develop systemic demyelination.

Optic neuritis typically presents as sudden unilateral blurred vision progressing over a few days. The vision is often described as being "washed out"; colours appear desaturated and there is often associated retro/peri-ocular pain aggravated by eye movements.

Signs include reduced acuity of variable severity from minimal to "no perception of light"; an afferent pupillary defect (pupil dilates during the "swinging light" test); and dyschromatopsia (poor colour discrimination performance).

The most common visual field defect is a central scotoma. Ophthalmoscopy may reveal a swollen optic disc although the disc is often normal in the retrobulbar type of MS. Optic atrophy (associated with previous attacks) may be found in the ipsi- or contra-lateral eye.

Visual recovery is slower than the initial loss and usually takes between four to six weeks. About 90% of sufferers recover normal visual acuity. Minor defects in colour vision and brightness appreciation may persist. The effects of subsequent attacks are additive. There is no correlation between the degree of visual defect during the attack and the final visual outcome.

All pilots with optic neuritis should be referred to a Designated Aviation Ophthalmologist. Examinations should include visual field plots of both eyes. A typical case may require CT and MRI scanning to rule out compression of optic nerves or chiasma.

Sinister features in applicants with MS include failure of visual recovery after four weeks, persistent periorcular pain, proptosis, development of a quadrantic or hemianopic visual field defect, and field defect in the contralateral eye. All cases with severe visual acuity loss (<6/60) should be further investigated.

Flying duties in between infrequent attacks are possible provided there is adequate neurological and visual function monitoring. All cases should be referred to the Aviation Medicine Section for final assessment after adequate work up.
2.1.18 Glaucoma

All applicants for flight crew licensing who have glaucoma, or whom the DAME suspects may have glaucoma, must be assessed by a Designated Aviation Ophthalmologist. The DAME should not revalidate their Medical Certificates.

**Primary Glaucoma**

**Closed Angle Glaucoma**

Applicants should not be passed until the condition has been surgically corrected. Once corrected, a pass assessment may be issued after ophthalmological review.

**Open Angle Glaucoma**

Most open angle glaucoma is controlled by medication. The Aviation Medicine Section may issue a pass assessment only after receipt of a satisfactory ophthalmologist's report, which must include results of perimetry.

Preferred treatment is with beta-blocker drops. However, applicants with glaucoma controlled by other means are assessed individually.

Open angle glaucoma that has been successfully treated by microsurgical or laser techniques may be assessed as meeting the required standard by the Aviation Medicine Section.

Open angle glaucoma controlled with drugs requires annual ophthalmological review, including perimetry.

**Secondary Glaucoma**

Medical assessment depends on the underlying disease and the effectiveness of control. All cases should be referred to a Designated Aviation Ophthalmologist.
2.1.19 Macular Disease

The symptoms of macular disease include blurring and distortion of vision with micropsia or macropsia, which can be assessed with an Amsler grid. (This consists of a piece of paper showing a 10cm square divided into 5mm squares with a central fixation dot).

The subject is asked to fixate on the central dot, with each eye separately, at one third of a metre and to mark on the chart with a pencil, scotomata or areas of distortion.

When abnormalities are present, immediate referral to a Designated Aviation Ophthalmologist is required.

The commonest conditions affecting the macula are Central Serous Retinopathy and Disciform Macular Degeneration. All cases require final assessment by the Aviation Medicine Section.

Central Serous Retinopathy

The condition affects healthy young men with a hectic lifestyle. Only one eye is usually affected and reduction of acuity is mild (6/12 or 6/18). With a direct ophthalmoscope, dulling of the macular reflex is seen, representing a shallow central retinal detachment.

Vision recovers spontaneously within six weeks in 90% of cases. Stereoaucuity is temporarily lost and pilots should not fly until full recovery occurs. Laser treatment has been shown to speed the resolution of symptoms, but does not improve the final visual outcome, and no treatment is usually advised. The condition recurs in 20 to 30% of cases and the second eye is affected in 20%.

Macular Degeneration

This condition typically affects the elderly but inherited forms may affect younger people. Ophthalmoscopy may show small grey, yellow or white lesions, like small crystals, at the macula. These are called "drusen" (German, druse = nodule).

The visual acuity is usually well preserved, 6/9 or 6/12, until a further complication occurs — the development of a subretinal neovascular membrane that spreads under the macula and reduces vision to 6/60 or less.

To prevent the visual acuity from deteriorating below standard, regular follow-up is essential. In the early stages when the vision is distorted, but the acuity well preserved, the subretinal membrane can be obliterated by argon laser treatment.
2.1.20 Retinal Detachment

This may occur at any age although it is commoner in the elderly. Myopic people, particularly high myopes, are at increased risk. Advice on the long-term prospect of an aviation career should be given to those with high myopic refractive errors.

The most frequent type of retinal detachment follows collapse of the vitreous gel — Posterior Vitreous Detachment. The symptoms are a sudden shower of floaters (caused by vitreous haemorrhage or pigment release) and flashing lights, due to vitreous traction on the retina. Urgent referral to an ophthalmologist is mandatory to exclude the presence of a retinal tear.

At the stage when the retina is torn, but not yet detached, laser treatment may be used to seal the retinal tear before fluid from the vitreous cavity passes through it to detach the retina. Once the retina begins to detach, prompt surgery is necessary. If surgery can be undertaken before the retina detaches from the macula, the prognosis for maintained vision is excellent. Once the macula has been detached for more than a few hours, visual recovery is only partial.

A special form of retinal detachment, retinal dialysis, is the commonest type of detachment seen in young, otherwise healthy people who are not myopic. It may occur after a blunt injury, which causes a tear in the extreme periphery of the retina.

Intraocular gases are often injected into the vitreous cavity during retinal detachment surgery. The most commonly used gases are air, sulphur hexafluoride (SF6) and perfluoropropane (C3F8). Air takes only three or four days to be resorbed whereas the longest acting gas, C3F8, persists for up to six weeks. Air travel should be avoided until the gas bubble resorbs. Bearing in mind even in pressurised aircraft cabin altitude can be up to 8,000ft; a dangerous rise in intraocular pressure can occur if this precaution is overlooked.

In all cases of retinal detachment, once the condition is stabilised, a computerised visual field plot is mandatory before considering the applicant for return to pilot duties. The pilot should retain a copy of the plot for future comparison. The Aviation Medicine Section assesses each case individually.

2.1.21 Retinal Injuries

If a severe injury to the eye has occurred, with definite or suspected perforation of the globe, any aerial transport should be conducted at a cabin altitude of 4,000ft or less.
2.1.22 Strabismus

Whereas some degree of heterophoria is the norm, heterotropia (i.e. a manifest deviation of one eye from its normal position which occurs despite both eyes being open and uncovered), requires assessment by a Designated Aviation Ophthalmologist and final assessment, on an individual basis, by the Aviation Medicine Section. An applicant with an acuity (corrected or uncorrected) of worse than 6/12 is unacceptable, and a binocular acuity of worse than 6/9 is also unacceptable.

A majority of squint sufferers who have excellent cosmetic results from surgery and good visual acuity in each eye may still lack normal stereopsis (depth perception). They develop distance judgement by monocular cues and these are usually superior to those available to applicants who have lost an eye. However, their fine distance judgement for near distances is inferior to those with normal binocular vision. The Aviation Medicine Section individually assesses persons lacking binocular vision.

Squint may be latent or manifest. A latent squint is likely to become manifest under the influence of such factors as illness, fatigue, stress, drugs or alcohol. A cover test alternately on each eye unmasks latent squint.

The tests described below are designed to detect those who lack binocular vision.

**Cover Test**

Test at near (30cm) and at six metres. Use an accommodation fixation target at both distances. (For near an N5-size print and for distance a 6/12 letter). Ask subject to look at the fixation target, cover one eye and observe the other eye for refixation movement. Repeat test procedure for the other eye. Any refixation movement indicates possible squint.

**Lang Stereo Test**

Test at near (30cm). Hold card still and ask subject to name any pictures seen. Pass is three pictures: cat, star and car. A new Lang stereo test that tests to 200 degrees of arc is available. This may be considered superior to the standard Lang test that tests to 55 degrees of arc.

**Worth Four Dot Test**

Subject wears red/green goggles. Pass is identifying four lights, one red, two green and one white. Test at six metres only. Those who fail can undergo further tests, for example six-metre vectograph or Bagolini lens test to confirm if they truly lack binocular vision.
2. Medical Aspects
2.1 Ophthalmology

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2.2.1 Introduction

This section details the requirements for cardiological assessment of an aircrew member or air traffic controller and provides guidance on the aeromedical disposition of pilots and cardiovascular disease.

The aim of the examination is to ensure that the applicant does not suffer from any cardiovascular condition which carries an increased risk of incapacitation or which produces a decrement of physiological functional reserve that may jeopardise operational safety.

The DAME should recognise that an individual with an unrestricted Medical Certificate must be capable of performing all of the activities that are possible under the licence held.

These activities could include:

- Aerobatics, with the possibility of high G forces being encountered
- Operations in extremes of temperature for long periods
- Operations at altitudes where the partial pressure of atmospheric oxygen is decreased to two-thirds that which exists at sea level.

2.2.2 The Cardiovascular Standard – CASR Part 67

The cardiovascular standards are found in the following paragraphs of CASR Part 67:

- CASR 67.150 For medical standard 1
  - CASR 67.150(7)
  - Table 67.150
  - 1.9 – 1.11

- CASR 67.155 For medical standard 2
  - CASR 67.155(7)
  - Table 67.155
  - 2.9 – 2.11

- CASR 67.160 For medical standard 3
  - CASR 67.160(7)
  - Table 67.160
  - 3.9 – 3.11
2.2.3 Assessment

The DAME should note relevant risk factors for ischaemic heart disease in assessing an individual’s cardiovascular system. The risk factors to be considered are:

- Age
- Total cholesterol (fasting estimation)
- The total cholesterol to HDL cholesterol ratio (fasting estimation)
- Blood glucose (fasting estimation)
- Cigarette smoking
- Systolic blood pressure
- Hypertension
- Diabetes Mellitus
- Obesity
- Lack of regular exercise
- Positive family history of cardiovascular disease.

Obesity—while not a strong independent risk factor for ischaemic heart disease—when present, should be a trigger for more intensive evaluation of risk factors.

An applicant with multiple coronary artery disease risk factors should be considered for more detailed examination such as stress ECG.

**Mandatory Cardiovascular Risk Factor Profiling**

This is required for all Class 1 applicants in the years when fasting lipids are required.

Risk factor profiling is also required for all diabetic applicants of all classes of certificate at initial assessment after a diagnosis of diabetes has been made and at 5-yearly intervals subsequently.

A score should be calculated for the applicant with regard to age, lipid profile, systolic blood pressure, smoking, diabetes and LVH on ECG. At a score of 15 points, the 10-year probability of cardiac events approaches 1% per annum, which is the risk considered acceptable for professional aviators in a multi-crew environment. When the coronary risk score is 15 or above, applicants are required to have stress testing. It is a requirement for points-based stress tests, that the test is read and interpreted by a cardiologist. In situations where it is not feasible to have a cardiologist perform the stress test (eg, geographical access) then the test may be performed by a physician experienced in the performance of stress tests.

The requirements for mandatory 12-lead resting ECGs are detailed in section 1.4.1 Electrocardiographs in 1. Administrative Aspects.

2.2.4 General Principles

The following conditions are statistically associated with reduced functional capacity in cardiac reserve or with unpredictable risk of sudden incapacitation. Applicants with such conditions should therefore be assessed as medically unfit for certification. In individual cases, after thorough assessment, some may be granted Medical Certification.

- Uncontrolled systemic or pulmonary hypertension
- Any structural and/or physiological defect of the heart or circulation which results in regional circulatory ischaemia of a critical circulatory bed, or in ventricular hypertrophy or ventricular dilatation
- Any structural or physiological defect of the heart which results in electrical instability, either dysrhythmia or conduction defects
- A diagnosis of haemo dynamically significant aortic stenosis
- Any structural or physiological defect of the heart or lungs which results in veno-arterial shunting and desaturation of arterial blood
- Any structural or physiological defect (and/or its consequences) that require the use of cardiotonic or vasoactive agents for compensation of cardiac reserve and for control.
2.2.5 Hypertension

Uncontrolled hypertension is disqualifying. A systolic pressure of 150 mm Hg and/or diastolic pressure of 90 mm Hg are the upper limits acceptable, but the applicant's age and sex should also be considered. If either or both the systolic and diastolic pressure repeatedly exceed(s) these limits, the applicant's blood pressure is not acceptable, even if on treatment. (These values accord with recommendations of the National Heart Foundation of Australia). Investigations by 24-hour ambulant blood pressure monitoring may assist diagnosis of borderline cases.

Controlled (adequately treated) hypertension is allowable at all levels of licence provided that there is:

- No significant end organ damage
- Satisfactory ECG
- No adverse drug side effects.

Acceptable Medication

Most modern antihypertensive agents are acceptable for control of hypertension in aircrew, provided the applicant is established on the medication and has exhibited no adverse side effects from the drug(s).

The applicant must not pilot any aircraft or actively control air traffic following the commencement of antihypertensive therapy or of a changed treatment regimen until such time as there are no significant side effects from medication and, in any event, not within one week of the commencement of therapy or change in medication. Preferred drugs include diuretics, ACE inhibitors, calcium channel blockers, prazosin angiotensin II antagonists and beta-blockers. Particular care should be taken with use of antihypertensive medications by aerobatic pilots, because of the reduction in G-tolerance produced by these agents.
2.2.6 Ischaemic Heart Disease

Technical Specifications of Investigative Procedures Required in these Protocols

**Stress Electrocardiogram**

1. Bruce protocol with a 12-lead ECG, with monitoring for at least five (5) minutes after cessation of exercise.

2. Applicant to reach at least 100% of predicted heart rate and at least nine minutes on the Bruce protocol or equivalent on the bicycle ergometer (maximum predicted heart rate = 220 beats per minute minus applicant’s age in years for men, 200 beats per minute minus applicant’s age in years for women).

3. Treadmill exercise is preferred but bicycle exercise is acceptable if the applicant is unable to perform on the treadmill.

4. Applicant should have been continuously in the time zone where testing is performed for at least 72 hours prior to the test.

5. Applicants should normally cease taking any beta-blocker 48 hours prior to the stress test, unless the medication is used to treat known ischaemic heart disease or a significant arrhythmia.

   When a beta-blocker is not so ceased prior to stress testing an applicant, an explanation of the reason is required from the treating or investigating cardiologist who supervises the stress test.

6. All reports of stress tests should include the following details:
   - duration of exercise (with comment if less than nine minutes);
   - level of perceived exhaustion of the applicant; and
   - any symptoms experienced by the applicant.

7. A positive stress electrocardiogram is defined by 1.0 mm or more of horizontal or down sloping ST segment depression at 0.08 sec after the J point.

8. A positive stress ECG is of adequate diagnostic validity if recorded when an applicant’s exercise capacity, heart rate and blood pressure responses reach at least 85% of predicted for age, sex, height and weight, and where the ST segment shift is consistent with ischaemia.

**Note:** A rise of more than 20 mm in systolic blood pressure response is expected. If the applicant returns a positive stress ECG with ST changes before reaching 100% of designated criteria, it is a matter of even greater aeromedical concern. Exercise electrocardiograms are a screening test for the presence of Ischaemic Heart Disease (IHD) but do not provide conclusive evidence of the presence of IHD. Applicants need not refrain from exercising privileges simply because they are required to undertake a stress ECG.
9. If an applicant is unable to reach nine minutes or equivalent on stress ECG then a gated heart pool scan and cardiologist’s opinion may be acceptable alternatives. In these circumstances, the reason for ceasing the test must be stated.

10. In appropriate circumstances (e.g., severe arthritis), pharmacological stress testing may be substituted. This should be discussed with CASA Aviation Medicine Section before it is undertaken.

11. The physician supervising the investigation should report exercise ECGs. Computer reporting of exercise ECGs is not acceptable to CASA. In addition, CASA expects that when a stress test is required for clinical reasons, the cardiologist or physician responsible for the test will clinically evaluate that applicant.

12. Where an applicant has undergone recurrent false positive stress ECGs with ischaemia ruled out by means of a stress nucleotide scan, future stress ECGs may be accepted as normal provided there is no significant change to the ECG findings from year-to-year and the level of exercise in METS remains satisfactory.

**Stress Echocardiogram**

1. To be performed by an experienced laboratory, using standard recognised protocol, because of possible difficulty with interpretation.

2. Aim should be to achieve 100% of predicted heart rate, as for stress electrocardiogram, without developing any symptoms or signs of myocardial ischaemia.

3. For applicants undergoing pharmacological stress echocardiography using sympathomimetic stressors, atropine may be administered following the maximal dose of dobutamine.

4. A positive stress echocardiogram is defined by severe or extensive new wall motion abnormalities, horizontal or down sloping ST segment depression >1mV at 0.08 seconds after the J point compared with baseline; new ST segment elevation >0.1mV in applicants without a previous myocardial infarction, or significant tachyarrhythmia. Applicants who have a positive stress Echocardiogram should not exercise privileges until their cardiac status is clarified.

5. If an applicant is unable to achieve 100% of predicted heart rate or if the test is terminated for other reasons, the reasons for ceasing the test must be stated.

6. ECG recordings should be carried out contemporaneously during the exercise test, and should be commented upon by the interpreting physician.
Stress Nucleotide (Thallium or Sestimibi) Scan

2. Bruce protocol stress to a minimum of 100% of predicted maximal heart rate and at least nine minutes exercise time.
3. Applicant should have been continuously in the time zone where testing is performed for at least 72 hours prior to the test.
4. Applicant should continue to take his/her usual medication(s) until tested.
5. Re-injection or 24 hour view if defects are present. This additional requirement may be omitted if the defect(s) is/are demonstrated to be non-reversible.
6. A satisfactory exercise nucleotide scan is recorded when the exercise or nucleotide scanning does not reveal defects consistent with myocardial ischaemia. Applicants who have a positive stress radio nucleotide scan should not exercise privileges until their cardiac status is confirmed.
7. ECG recordings should be carried out contemporaneously during the exercise test, and should be commented upon by the interpreting physician.

Coronary Angiogram

1. The angiogram is to demonstrate all major vessels, their tributaries, and grafts if present.
2. Left ventriculogram should be performed.
3. A significant stenosis is considered to be present if there is greater than 50% narrowing of any artery.
4. A satisfactory coronary angiogram is recorded when there is no significant stenosis seen in the native coronary circulation and/or where coronary artery bypass grafts appear without discernible wall pathology or have only minor irregularities.
5. The report should include a diagrammatic representation of the coronary arteries.

Gated Blood Pool Scan

1. Measurement of the ejection fraction gated heart pool scan may be required for uncertain cases where the ejection fraction is borderline or unreliable on stress nucleotide scan or stress echocardiogram.
2. The scan should show an ejection fraction greater than 45%.
Electron Beam Computed Tomography and ‘Calcium Scores’

1. Aviation Medicine is considering the potential use of this technology. However, in common with other regulators, it does not currently accept the results of these investigations as substitutes for any other required tests.

Cardiologist’s Assessment

This is to include recording of:

1. Clinical status.
2. Control of risk factors, including smoking and obesity.
3. Hyperlipidemia, hypertension, or diabetes mellitus.
4. A satisfactory gated heart pool scan, which should demonstrate no wall motion abnormalities associated with moderate hypokinesis.
5. An overall ejection fraction greater than 45%.
6. An acceptable fasting lipid profile, where total cholesterol is less than 5.5 mmol/L and the HDL fraction is greater than 1.0 mmol/L. Note that both HDL and LDL fractions should be recorded.

Cardiologist’s Review

This is to occur at six-monthly intervals and should include recording of:

1. Clinical status.
2. Control of risk factors, including smoking and obesity.
3. Hyperlipidemia, hypertension, or diabetes mellitus.
4. An acceptable fasting lipid profile, where total cholesterol is less than 5.5 mmol/L and the HDL fraction is greater than 1.0 mmol/L. Note that both HDL and LDL fractions should be recorded.

Issue of Aviation Medical Certificate Following Myocardial Infarction

Class 1, 2 or 3 Medical Certificates

Following the infarction, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months after the event.
Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment at six-monthly intervals
- Stress nucleotide scan (preferred) or stress echocardiogram.
- Ejection fraction estimation
- Coronary angiogram, unless this has already been undertaken.

If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction.

Subsequent Reviews

12 months post myocardial infarction:
- Routine aviation medical examination
- Cardiologist’s review every six months
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

At yearly intervals thereafter:
- Routine aviation medical examination
- Cardiologist’s review every six months
- Stress ECG at yearly intervals.

Issue of Aviation Medical Certificate Following Coronary Artery Bypass Graft (CABG).

Class 1, 2 or 3 Medical Certificates

Following the graft, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

This will not be considered until six months after the surgery for Class 1, 2 or 3.

Recertification

Investigations required for recertification are:
- Routine aviation medical assessment
- Cardiologist’s assessment
- Stress nucleotide scan
- Ejection fraction estimation.
If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction.

**Subsequent Reviews**

12-month intervals post coronary artery bypass graft:
- Routine aviation medical examination
- Cardiologist’s review every six months
- Stress ECG yearly.

**Note:** Angiography is no longer routinely required every five years, but may be required if an applicant develops new symptoms or other evidence suggesting worsening IHD despite treatment.

**Issue of Aviation Medical Certificate Following Coronary Artery Angioplasty**

**Class 1, 2 and 3 Medical Certificates**

Following angioplasty, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

This will not be considered until six months post angioplasty for all classes. While preliminary data suggested that drug-eluting stents may reduce the incidence of post angioplasty stenosis, more recent studies reveal that drug-eluting stents are associated with an increased risk of late thrombosis. As such, bare metal stents are preferable in the aviation context. CASA is not prepared to reduce the six-month post-treatment period at this time. CASA will continue to monitor this issue.

**Recertification**

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram
- Ejection fraction estimation.

If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction at all classes.
Subsequent Reviews

12-month intervals post angioplasty:
- Routine aviation medical examination
- Cardiologist’s review completed six-monthly
- Stress ECG.

Note: Angiography is no longer routinely required every five years, but may be required if an applicant becomes symptomatic or has other evidence suggesting worsening HID despite treatment.

Issue of Aviation Medical Certificate Following Evidence of Ischaemic Heart Disease

Class 1, 2 or 3 Medical Certificates

When an applicant presents with:
- Ischaemic heart disease symptoms such as angina, arrhythmia; or
- Cardiac failure or other evidence of ischaemic heart disease, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment conducted six-monthly
- Stress nucleotide scan (preferred) or stress echocardiogram
- Ejection fraction estimation.

If the stress nucleotide scan or stress echocardiogram is positive, the applicant must proceed to an angiogram.

If all investigations up to and including the stress nucleotide scan or stress echocardiogram are negative, the subject may be recertificated.

If the stress nucleotide scan or stress echocardiogram is positive but a subsequent angiogram is reported as satisfactory, the applicant may be recertificated.

Subsequent Reviews

This will depend on individual case assessment.
2.2.7 Valvular Heart Disease

Uncorrected Aortic Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist reports are satisfactory, the applicant may be recertificated for a period of one or two years depending on the severity of the condition and the rate of deterioration.

Subsequent Reviews

At annual or biennial intervals:
- Routine aviation medical examination
- Cardiologist’s review
- Echocardiogram
- ECG.

Corrected Aortic Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA.
Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.

Where a tissue valve is used and there is no requirement for anticoagulation and certification may be unrestricted.

Where a mechanical valve is used, the applicant is to have evidence of clinically satisfactory, well-controlled anticoagulation and Class 1 medical certification will be restricted to multi-crew operations.

Subsequent Reviews

Classes 1, 2 and 3 require yearly review by a cardiologist.

Uncorrected Aortic Stenosis

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Electrocardiogram
- Doppler echocardiogram
- Chest X-ray.
If all of the investigations and the cardiologist’s report are satisfactory, the applicant may be recertificated solo for a period of 12 months, provided the following criteria are met:

- Aortic valve calcification grade 1 or 2
- Valvular Doppler jet velocity <3m/s
- Valve area >1.0cmsq
- Asymptomatic.

**Subsequent Reviews**

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and the cardiologist’s report are satisfactory, the applicant may be recertificated solo for a period of 12 months, provided the following criteria are met:

- Aortic valve calcification grade 1 or 2
- Valvular Doppler jet velocity <3m/s
- Valve area >1.0cmsq
- Asymptomatic.

**Corrected Aortic Stenosis**

**Class 1, 2 and 3 Medical Certificates**

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.
Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and the cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.

Where a tissue valve is used and there is no requirement for anticoagulation, medical certification may be unrestricted.

Where a mechanical valve is used, the applicant is to have evidence of clinically satisfactory well-controlled anticoagulation, and Class 1 medical certification will be restricted to multi-crew operations.

Subsequent Review

Class 1, 2 and 3 all require annual review by a cardiologist.

Aortic Root Dilatation

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA.

Yearly assessment by echocardiogram is required once the aortic root size reaches 3.8-4.0cm/m² due to the risk of rupture.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram.

If all of the investigations and the cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.
Subsequent Review

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram.

Uncorrected Mitral Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months without restriction.

Subsequent Reviews

At annual intervals thereafter:
- Routine aviation medical examination
- ECG
- Doppler echocardiogram
- Cardiologist’s review.
Corrected Mitral Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Doppler echocardiogram.

If the valve is replaced, a significant risk of embolism may remain, particularly if factors such as poor left ventricular ejection fraction, left atrial dilatation, atrial fibrillation and poor INR control are present.

Cases will be considered on an individual basis. Assessments will not be made until at least six months post surgery.

For valve repairs, if reports are favourable, applicants may initially be recertificated for 12 months.

Subsequent Reviews

Valve Replacements:

For Classes 1, 2 and 3, annual routine aviation medical examination. All applicants require cardiologist’s review with Doppler echocardiogram.

Valve Repairs:

All applicants require a routine annual aviation medical examination and cardiologist’s review with Doppler echocardiogram.
Uncorrected Mitral Stenosis

Class 1, 2 and 3 Medical Certificates

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram.

Applicants with mild uncorrected mitral stenosis (where the valve area is greater than 1.5 cm², the heart is in sinus rhythm, where there is no history of atrial fibrillation and the left atrial diameter is less than 4.5 cm), are permitted recertification for 12 months.

Other applicants will be considered on a case-by-case basis.

Subsequent Reviews

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- ECG.

Corrected Mitral Stenosis

Class 1, 2 and 3 Medical Certificates

Recertification

Investigations required for recertification following mitral valvotomy are:
- Routine aviation medical examination
- Cardiologist’s assessment, which is to include assessments of the incompetence and stenosis
- Doppler echocardiogram
- ECG.

If all of the investigations and cardiologist’s reports are satisfactory following mitral valvotomy, the applicant may be recertificated for a period of 12 months.
Following Mitral Valve Replacement

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA. This will not be considered until at least three months following mitral valvotomy or replacement.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Doppler echocardiogram
- ECG.

Following mitral valve replacement, applicants will be considered on a case-by-case basis on consideration of individual risk factors. Those with significant echocardiographic changes such as LA dilatation or atrial fibrillation may be subject to more stringent restrictions to their certificate.

Subsequent Reviews

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram.

Uncorrected Mitral Valve Prolapse

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram.

Applicants will be assessed on a case-by-case basis. Those with mitral valve prolapse with minimal or trivial mitral incompetence should require no more stringent follow up than clinically indicated. Those with more significant sequelae will be considered in accordance with their ongoing risk and rate of deterioration of their condition.
2.2.8 Bundle Branch Blocks

**Partial or Complete Left Bundle Branch Block (Not Including Left Anterior Hemiblock)**

Class 1, 2 & 3 Medical Certificates

**Recertification**

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan
- Doppler echocardiogram
- Left ventricular gated blood scan to measure ejection fraction
- 24 hour Holter monitor recording.

If all of the investigations and cardiologist's reports are satisfactory, the applicant may be recertificated for 12 months.

**Subsequent reviews**

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review.

**Incomplete Right Bundle Branch Block**

This is a common finding. There are no specific requirements.
Complete Right Bundle Branch Block

Class 1, 2 and 3 Medical Certificates

Note: This may be a normal variant in young applicants. A cardiologist’s opinion should however be obtained in these cases.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Echocardiogram
- Stress ECG if combined with LAHB as the combination is associated with ischaemic heart disease.

If all of the investigations and cardiologist's reports are satisfactory, the applicant may be recertificated for the maximum period permitted for the relevant medical certificate.

Left Anterior Hemiblocks

Class 1, 2 and 3 Medical Certificates

This is a common finding, however if this is a newly acquired condition, a stress ECG should be performed. If this is normal, there is no requirement for further reviews.

Atrio-Ventricular Blocks

First Degree

The only specific investigation required for those with first degree AV block is for a resting ECG, taken after exercise to ensure the block normalises with exercise. This may practicably be done in the DAME office.
Second Degree — Class 1, 2 and 3 Medical Certificates

Otherwise, on diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Cardiologist’s assessment
- 24 hour Holter monitor recording
- Stress ECG.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for 12 months. Applicants with untreated heartblocks of 2:1 or greater will not be recertificated for any class of medical certificate.

Subsequent Reviews

An annual ECG is required.

Third Degree Heart Block

Restricted certification may be available with the use of pacemakers.

Class 1, 2 and 3 Medical Certificates

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress ECG (to assess cardiac function)
- 24 hour Holter monitor recording.

Note: The pacemaker is to be dual chambered with bipolar leads, due to the unacceptable risk of electrical interference with pacemakers that have unipolar leads. The pacemaker is to have a technical check every 12 months, with the outcome reported to the Aviation Medicine Section.
Atrial Fibrillation and Atrial Flutter

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment, with particular reference to history and presence of any congenital abnormalities
- ECG
- 24 hour Holter monitor
- Doppler echocardiogram
- Stress test (to evaluate rate control at high workload)
- Biochemical profile, including: thyroid function studies, liver function studies, serum magnesium and potassium levels, fasting blood glucose (FBG).
- Haemoglobin estimation.

If drug treatment is required, there must be adequate rate control (as assessed by a cardiologist), without significant side effects. There should be no underlying structural heart disease. In these circumstances, all applicants may be recertificated for 12 months without restriction, unless prescribed warfarin. Where Warfarin is prescribed, CASA will require evidence of good INR control.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review.

Bradycardias

Bradycardia should be taken in context. In a normally fit and healthy person or in an athletic individual there is nil concern. If the individual is generally unfit, has symptomatic bradycardia or if other ECG anomalies are associated with the bradycardia, then the applicant should be referred for cardiological assessment.
Ventricular Tachycardias

Ventricular tachycardias is most commonly picked up in the context of a stress test, in which case it may be normal. If VT arises in other contexts, the applicant should be referred for cardiological assessment.

Supraventricular Tachycardias

Most individuals with frequent episodes of supraventricular tachycardias will receive radiofrequency ablation, which, if successful, will be of no further concern. If controlled by medication, cardiological review should be sought with each medical examination. Applicants with SVT will be assessed on a case-by-case basis, however those with frequent episodes, and particularly those who experience significant symptoms with SVT may not be considered fit.

Wolff-Parkinson-White Syndrome

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Electrophysiological studies.

If WPWS is confirmed, the applicant is assessed as unfit until radiofrequency ablation of aberrant conduction pathways has been performed and the treating cardiologist has certified that conduction has been normalised.

Individuals who have demonstrated long refractory periods, where the WPW abnormality normalises on exercise may be considered for restricted certification on a case-by-case basis.
Subsequent Reviews

At six months, 12 months and 24 months post successful radiofrequency ablation of aberrant conduction pathways, the following are required:

- Routine aviation medical examination
- Cardiologist’s review.

If there is no recurrence of abnormal conduction within 24 months of successful radiofrequency ablation, further recertification without restriction should follow the normal pattern for the applicant’s age and class of medical certificate.

Prolonged QT Syndrome

Those applicants with long QT syndrome will generally be disqualified due to the risk of sudden death. Individuals will be assessed on a case-by-case basis, based on cardiological opinion.

Brugada Syndrome

Applicants with Brugada syndrome on ECG will require individual assessment by an electrophysiologist and cardiologist. Stratification is difficult; however there may be a subgroup with a relatively good prognosis. However, most individuals with Brugada syndrome will be assessed as unfit. Insertion of implantable defibrillator is not adequate risk mitigation in these individuals.

Defibrillators

Applicants requiring implantable defibrillators will be assessed as unfit. Studies show that 15% of shocks delivered are inappropriate. They are also potentially affected by EMF emissions. In addition, the risk of acute incapacity associated with a shock, regardless of the underlying pathology, is considered incompatible with aeromedical certification.

Corrected Congenital Heart Anomalies

In many cases, residual haemodynamic defects may preclude medical certification at any level for these applicants. Each case will be dealt with on its individual merits. A comprehensive cardiological work-up and report should be completed and full details forwarded to Aviation Medicine Section for assessment.
Other Cardiological Abnormalities

These can be extremely varied and range from trivial conditions to those which absolutely preclude medical certification at any level for these applicants. Each case will be dealt with on its individual merits. A comprehensive cardiological work-up and report should be completed and full details forwarded to Aviation Medicine Section for assessment.

2.2.9 Cardiomyopathies

Dilated Cardiomyopathy

Class 1, 2 and 3 Medical Certificates

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Two recordings of 24 hours Holter monitor studies
- Gated blood pool scan or echocardiogram assessment of cardiac output.

If ejection fraction is greater than 45% with no symptoms and a normal Holter monitor report, then a restricted certificate, on the basis of cardiological assessment of ongoing risk of arrhythmia etc, may be allowed. Individuals will be assessed on a case-by-case basis.

Subsequent Reviews

Class 1: Cardiologist’s review with gated blood pool scan or echocardiogram.
Hypertrophic Cardiomyopathy

Class 1, 2 and 3 Medical Certificates

Recertification

This condition is generally disqualifying. In all cases, further certification will be appropriately restricted.

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment, including detailed family history
- Stress ECG
- Doppler echocardiogram
- 24 hour Holter monitor recording.

If all of the investigations and the cardiologist’s report are satisfactory, and septal thickness is less than 1.5 cm, restricted recertification may be available.

Subsequent Reviews

Requirements will be individually determined and notified.

2.2.10 Cardiac Transplant

Applicants for Class 1 certification will be assessed as unfit.

Class 2 and 3

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Coronary angiogram (for detection of atherosclerosis)
- 24 hour Holter monitor recording
- Doppler echocardiogram.

If all of the investigations and the cardiologist’s report are satisfactory, Class 2 and Class 3 applicants may be recertificated on an individually determined basis.
Subsequent Reviews

At six-monthly intervals:
- Routine aviation medical examination
- Cardiologist’s review.

At annual intervals:
- Stress nucleotide scan
- Coronary angiogram (to assess coronary atherosclerosis)
- Doppler echocardiogram.
2.3.1 Introduction

This section details the assessment procedures for pilots, other aircrew members and air traffic controllers who suffer or who may suffer from lung or respiratory system disease.

The aim of the respiratory assessment within the aeromedical examination is to ensure that applicants do not suffer from lung or respiratory system disease which places them at an unacceptable risk of incapacitation, or which may otherwise jeopardise the safety of air navigation.

2.3.2 The Respiratory Standard – CASR Part 67

CASR 67.150 For medical standard 1 Table 67.150
1.12 – 1.13

CASR 67.155 For medical standard 2 Table 67.155
2.12

CASR 67.160 For medical standard 3 Table 67.160
3.12

2.3.3 Assessment

All applicants for Australian aviation medical certificates are administered a comprehensive screening questionnaire physically examined by a DAME, and required to undertake a number of screening tests.

When conducting the respiratory component of the aeromedical examination, the DAME should note the presence of relevant risk factors for the development of lung and respiratory system disease and the presence of signs and symptoms suggestive or diagnostic of such conditions.

For example: risk factors for the development of asthma include:

- Family history of asthma
- Personal or family history of smoking
- Other allergies or atopic symptoms.
2. Medical Aspects

2.3 Respiratory Disease

FEV₁ is measured at the original assessment and each renewal assessment. (Note spirometers should be calibrated to BTPS). Chest X Rays may be required if the applicant’s history or physical signs so indicate. This is likeliest in smokers or ex-smokers. Routine Chest X Ray is not required.

Further investigation of respiratory abnormalities may include flow loop spirometry, measurement of diffusion capacity, blood gas estimation (both at ground level and at simulated altitude) and various forms of imaging of the respiratory system.

Referral to a consultant respiratory physician may be required to confirm a diagnosis or to resolve concern over a differential diagnosis. CASA may also require an applicant for medical certification to be assessed by a consultant respiratory physician as part of its consideration of an applicant’s fitness for aeromedical certification.

2.3.4 Documentation of Respiratory Conditions

Many respiratory conditions are principally diagnosed and classified on the basis of history. DAMEs should take a careful and thorough clinical history before reaching a respiratory diagnosis, particularly a diagnosis that may significantly affect an applicant’s employment prospects. Particular attention must be paid to chronic use of any medications that are incompatible with the exercise of the privileges of licensure. Also see Section 2.13 Medication – Drugs and Flying/Controlling.

2.3.5 Asthma

Diagnosis and assessment

In the first instance care should be taken to ensure an accurate diagnosis of asthma, noting that the criteria of recurrent, reversible airways obstruction should be met. Subsequent assessment of asthma should distinguish between severity and control. Severity is in part determined by the amount of treatment required to maintain control (as evidenced by type and quantity of prescription or over-the-counter medications required to control asthma symptoms, the requirement for oral steroid medication and the number of Emergency Room presentations or hospital admissions due to asthma). CASA will not usually certificate applicants who suffer from severe asthma. Uncontrolled asthma, regardless of severity, is not acceptable in the aviation environment, and will preclude the issuing of any class of CASA medical certificate.

Applicants who have asthma which is well controlled (if necessary using anti-inflammatory therapy) may be eligible for any class of medical certificate. Applicants with mild well controlled asthma maybe required to undergo periodic spirometry. In the case of applicants with moderate well controlled asthma, periodic assessment by a respiratory physician may be required. CASA will notify specific requirements on a case-by-case basis.
Asthma severity

Severe asthma

Applicants with severe asthma experience continuous symptoms, limited physical capacity, and have a FEV₁ or peak flow measurement of less than or equal to 60% predicted. Peak flow variability may be greater than 30%. Treatment requirements of patients with severe asthma will likely include moderate or high doses of inhaled corticosteroid, with or without long-acting beta-agonist, oral theophylline, or inhaled anticholinergic. Some applicants may require oral corticosteroid. Patients with severe asthma may require care through hospital Emergency Rooms or even hospital admission when control of the condition is poor.

Moderate asthma

Applicants with moderate asthma generally have symptoms of airflow obstruction most of the time, and experience some impairment of physical capacity. Their FEV₁ or peak flow will be in the range 60-80% predicted, and peak flow variability may be greater than 15%. Treatment requirements will likely include low to moderate doses of inhaled corticosteroid, (e.g. beclomethasone 400-1000 micrograms per day or equivalent).

Mild asthma

Applicants with mild asthma generally have intermittent symptoms, interposed between symptom-free intervals that may be prolonged. FEV₁ and peak flows are often normal, and there may be no peak flow variability.

Asthma control

For CASA’s purposes, good control requires that, in the three months preceding assessment, the applicant:

- Has experienced no or minimal cough, wheeze or breathlessness on exercise or during the night
- Has maintained "best" pulmonary function
- Has maintained stable exercise capacity, although possibly somewhat impaired
- Has not required treatment with oral corticosteroid
- Has not required an Emergency Room visit/hospital admission for symptoms of asthma.
2.3.6 Chronic Bronchitis and Emphysema

Smokers aged 45 or more should undergo increased screening for these conditions for all classes of medical certificates. Positive findings dictate a full respiratory assessment, including a report by a respiratory physician. It is unlikely that applicants with severe chronic bronchitis or emphysema will meet the medical standard for issue of a class 1 medical certificate. However, restricted class 2 and 3 certification may be possible, on a case-by-case basis.

2.3.7 Pneumothorax

**Traumatic Pneumothorax.**

Medical certification for all classes is usually possible after review of medical reports covering precipitating factors, associated problems, extent of recovery and subsequent lung function. Full assessment by a respiratory physician may be required.

**Single Spontaneous Pneumothorax.**

An applicant who has had a spontaneous pneumothorax with full recovery and no obvious cause nor likelihood of recurrence may be assessed as fit for all classes of medical certification.

**Recurrent Spontaneous Pneumothorax.**

An applicant with recurrent spontaneous pneumothorax (defined as two or more episodes on the same side) is not usually acceptable for any class of medical certificate. If the pneumothorax has been surgically corrected by pleurodesis (mechanical or chemical) or pleurectomy, the applicant may be assessed as fit. Assessment by a respiratory physician may be required.

2.3.8 Pulmonary Tuberculosis

An applicant with active tuberculosis (but not open tuberculosis) may be medically certificated for any class provided there is adequate evidence that he/she is on appropriate therapy and there is no evidence of side effects from the therapy. Applicants with fully treated pulmonary tuberculosis should be aero medically assessed to determine the extent of lung damage/recovery. Assessment by a respiratory physician is required in all cases.
2.3.9 Sarcoidosis

Sarcoidosis is usually acceptable for all classes of medical certification, provided myocardial and other system sarcoidosis has been excluded. Reports of full cardiovascular and respiratory assessments are required.

2.3.10 Pulmonary Embolism

An applicant who develops pulmonary embolism must be comprehensively investigated to determine if there are significant underlying reasons for the episode. Once recovery is complete and the applicant demonstrates normal pulmonary function (including normal blood gases), unrestricted medical certification at any class is usually possible. CASA will not usually consider re-certification until at least 8 weeks after the episode. Pilots who are prescribed long-term anticoagulation with warfarin following a pulmonary embolism may be granted conditional certification.

2.3.11 Fibrosing Lung Diseases

Applicants with these conditions require full respiratory assessment, including blood gas estimation. Thereafter, certification may be possible on a case-by-case basis.

2.3.12 Obstructive Sleep Apnoea (OSA)

This condition is often under-reported because applicants fear loss of certification. DAMEs must specifically inquire whether or not the applicant has conditions that suggest OSA eg, loud habitual snoring, witnessed apnoea. Where the diagnosis is entertained, the Epworth Sleepiness Scale must be administered to the applicant. If the resulting score is 16 or more, assessment by a sleep physician is required. Following definitive diagnosis of OSA, unrestricted medical certification at all classes is usually possible after appropriate corrective treatment has been instituted and demonstrated to be successful. This usually requires reports from a sleep physician, before and after treatment.

Also see ‘Sleep Disorders’ in Section 2.6.17 (Psychiatry).

The Epworth Sleepiness Scale provides an estimate of the likelihood of dozing or falling asleep, in contrast to just feeling tired.

Applicants suspected of suffering from OSA should be questioned about their sleepiness during normal activities. (Even if the applicant has not recently undertaken some of these activities, they should be asked to estimate their relevant chance of dozing based on prior experiences).
Use this scale to allocate scores under 'chance of dozing' in each situation described.

- 0 = no chance of dozing
- 1 = slight chance of dozing
- 2 = moderate chance of dozing
- 3 = high chance of dozing

<table>
<thead>
<tr>
<th>Situation</th>
<th>Chance of dozing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting and reading</td>
<td></td>
</tr>
<tr>
<td>Watching television</td>
<td></td>
</tr>
<tr>
<td>Sitting inactive in a public place (e.g. a cinema or meeting)</td>
<td></td>
</tr>
<tr>
<td>As passenger in a car for &gt; 1 hour</td>
<td></td>
</tr>
<tr>
<td>Lying down to rest in the afternoon when circumstances permit</td>
<td></td>
</tr>
<tr>
<td>Sitting and talking to a companion</td>
<td></td>
</tr>
<tr>
<td>Sitting quietly after an alcohol-free lunch</td>
<td></td>
</tr>
<tr>
<td>In a car, while stopped briefly in heavy traffic</td>
<td></td>
</tr>
<tr>
<td><strong>Total Epworth Sleepiness Score</strong></td>
<td></td>
</tr>
</tbody>
</table>

If the score is 16 or more, assessment by a sleep physician is required.

(The Epworth Sleepiness Scale is reproduced with the permission of Dr M.W. Johns, A new method for measuring daytime sleepiness: the Epworth sleepiness scale. Sleep, 14(6):540-545.)
2.4 Endocrinology

2.4.1 Introduction

This section details the assessment of pilots, other aircrew members and air traffic controllers who suffer or who may suffer from endocrine disease or from metabolic disorders.

The aim of the endocrine assessment within the aeromedical examination is to ensure that applicants do not suffer from endocrine or metabolic conditions which place them at an increased risk of incapacitation or which may produce a decrement in physiological or psychological function sufficient to jeopardise the safety of air navigation. In conducting the aeromedical examination, the DAME will recognise that an individual who holds an unrestricted medical certificate must be capable of performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities may include flight (either as a private or professional pilot):

- For prolonged duration, often as part of a shift roster
- Subject to disrupted sleep and time zone changes
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning

A number of these stressors may also affect Air Traffic Controllers.
2.4.2 The Endocrine Standard – CASR Part 67

CASR 67 The endocrine standards are found in the following paragraphs of CASR Part 67:

CASR 67.150 For medical standard 1 CASR 67.150(7) Table 67.150 1.16
CASR 67.155 For medical standard 2 CASR 67.155(7) Table 67.155 2.15
CASR 67.160 For medical standard 3 CASR 67.160(7) Table 67.160 3.15

For Medical Standard 1:

“\textit{A person suffering from diabetes mellitus may be assessed as meeting medical standard 1 if the condition is satisfactorily controlled without the use of any anti-diabetic drug.}”

For Medical Standard 2:

“A \textit{person who suffers from diabetes mellitus may be assessed as meeting medical standard 2 if:}

\begin{itemize}
  \item [a.] \textit{The condition is satisfactorily controlled without the use of any anti-diabetic drug; or}
  \item [b.] \textit{If an oral anti-diabetic drug is used to control the condition:}
    \begin{itemize}
      \item [i.] \textit{The condition is under on-going medical supervision and control; and}
      \item [ii.] \textit{The oral drug is approved by CASA.}"
\end{itemize}
\end{itemize}

For Medical Standard 3:

“A \textit{person who suffers from diabetes mellitus may be assessed as meeting medical standard 3 if:}

\begin{itemize}
  \item [a.] \textit{The condition is satisfactorily controlled without the use of any anti-diabetic drug; or}
  \item [b.] \textit{If an oral anti-diabetic drug is used to control the condition:}
    \begin{itemize}
      \item [i.] \textit{The condition is under on-going medical supervision and control; and}
      \item [ii.] \textit{The oral drug is approved by CASA.}"
\end{itemize}

2.4-2
2.4.3 Assessment of the Endocrine System

All applicants for Australian aviation medical certificates are required to complete a comprehensive screening questionnaire, to be physically examined by a DAME, and to undertake urinalysis for the presence of urinary glucose. In addition, applicants for Class 1 and Class 3 medical certificates are required to undergo fasting blood glucose estimation at the same time as they undergo five-yearly fasting lipid estimation. (CASA intends to introduce a requirement that applicants for Class 2 medical certificates will also be screened five yearly for diabetes mellitus by means of fasting blood glucose estimation).

When conducting an aeromedical examination, the DAME should note the presence of relevant risk factors for the development of endocrine or metabolic diseases and the presence of signs and symptoms suggestive or diagnostic of such conditions. Where such an endocrine condition is confirmed, evidence of secondary pathology or of accompanying complications should be sought and documented.

For example, risk factors for the development of diabetes mellitus include:

- Ethnic group
- Age >55 years
- Positive family history
- Obesity or significant overweight
- Abnormality of glucose tolerance
- Pregnancy
- Hypertension, dyslipidaemia, or clinical macrovascular disease
- Lack of regular exercise
- Use of diabetogenic medications.

Evidence of pathology secondary to diabetes mellitus may include vascular disease, retinal disease or renal disease.
2. Medical Aspects

2.4 Endocrinology

2.4.4 Diabetes Mellitus and Impaired Glucose Tolerance

The incidence and prevalence of diabetes mellitus (of all types) has increased considerably in Australia in recent years. Up to 7.5% of the population now meets the diagnostic criteria for the condition (see Biochemical Investigations below). This is significant for aviation safety as diabetes mellitus is disqualifying for certification for aviation and air traffic control duties. The major aeromedical risk of diabetes relates to incapacitation (either overt or subtle), while it is also a major independent risk factor for a number of other incapacitating conditions—for example, stroke, acute myocardial infarction.

However, there is provision in the Civil Aviation Regulations for ‘a person who suffers from diabetes to be assessed as meeting the medical standard if the approved person conducting the relevant examination is satisfied that the diabetes is satisfactorily controlled without the use of an anti-diabetic drug’ or, for Class 2 and 3 medical certificate applicants, ‘where an oral anti-diabetic drug (approved by the Director of Aviation Medicine) is used to control the condition, the person provides evidence that he or she is undertaking on-going supervision and control of the condition’.

Classification of Diabetes Mellitus

Diabetes/diabetes precursor conditions are conventionally classified into four major types:

- Type 1 (absolute reduction in insulin production)
- Type 2 (resistance to the effects of insulin)
- Gestational
- Impaired glucose tolerance/impaired fasting glycaemia.

The majority of Type 1 diabetes mellitus sufferers use insulin regularly to manage the condition. Sufferers of Type 2 diabetes mellitus utilise a variety of management strategies: diet, oral hypoglycaemic agents and insulin, either singly or in combination.

Approximately one third of patients diagnosed with impaired glucose tolerance will subsequently have their glucose biochemistry return to normal, one third will continue to have impaired glucose tolerance and the remainder will eventually become sufferers of frank diabetes. Of aeromedical concern is the finding that all persons with impaired glucose tolerance have a statistically significant increase in their risk of developing ischaemic cardiovascular disease.
Biochemical Investigations

For medical certification purposes, any clinical suspicion of diabetes mellitus (such as urinalysis showing the presence of glycosuria) should be confirmed biochemically.

CASA recognises the following biochemical criteria, documented on at least two separate days, as confirming the diagnosis of diabetes mellitus:

- Fasting venous plasma glucose >6.9 mmol/l (less than 5.5 mmol/l—diabetes unlikely)
- Casual (random) venous plasma glucose >11.1 mmol/l (less than 5.5 mmol/l—diabetes unlikely).

Equivocal results of a fasting venous plasma glucose or casual venous plasma glucose estimation (between 5.5 and 6.9 mmol/l fasting or between 5.5 and 11.0 mmol/l casual) may indicate impaired glucose tolerance. In the event of an equivocal blood glucose result, DAMEs should order a 75 gram oral glucose tolerance test performed according to WHO 1999 guidelines and assessed according to the criteria in Table 2.4-1.

Table 2.4-1: WHO oral glucose tolerance test assessment criteria 1999

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Criteria—Venous plasma Glucose concentration (mmol/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes mellitus</td>
<td></td>
</tr>
<tr>
<td>Fasting value</td>
<td>7.0 or</td>
</tr>
<tr>
<td>2 hr post glucose load</td>
<td>&gt;11.1</td>
</tr>
<tr>
<td>Impaired glucose tolerance</td>
<td></td>
</tr>
<tr>
<td>Fasting value</td>
<td>&lt;7.0 and</td>
</tr>
<tr>
<td>2 hr post glucose load</td>
<td>7.8–11.0</td>
</tr>
<tr>
<td>Impaired fasting glucose</td>
<td></td>
</tr>
<tr>
<td>Fasting value</td>
<td>6.1–6.9 and</td>
</tr>
<tr>
<td>2 hr post glucose load</td>
<td>&lt;7.8</td>
</tr>
<tr>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>Fasting value</td>
<td>&lt;6.1 and</td>
</tr>
<tr>
<td>2 hr post glucose load</td>
<td>&lt;7.8</td>
</tr>
</tbody>
</table>
Other Investigations

All applicants for medical (re-)certification who have either diabetes mellitus or impaired glucose tolerance must also provide to the DAME the results of all glycosolated haemoglobin (HbA1c) estimations performed in the previous twelve months. A minimum of three estimations is required, with the most recent being performed no more than one month prior to DAME examination. (HbA1c results should be reported in % HbA1c and should indicate the laboratory reference range for the estimations.)

In addition, CASA requires the following information and test results from applicants with diabetes mellitus:

- A recent report (within three months) from an endocrinologist or specialist physician:
  - Current status of control of diabetes
  - Whether the applicant has any history of hypoglycaemia/hyperglycaemia in preceding 12 months.
  - If so, whether there was any requirement for external intervention or assistance.
- A copy of the applicant’s diary of ambulant blood glucose monitoring throughout the three months immediately prior to DAME examination. Desirable ranges are:
  - No readings below 2.8 mmol/litre
  - At least 90% of values between 5.5 mmol/litre and 10 mmol/litre.
- A copy of the applicant’s most recent annual ophthalmological assessment detailing:
  - Clinical status
  - Visual acuity (with and without correction)
  - Presence of retinal disease
  - Presence of other ophthalmic pathology.
- A copy of a recent cardiovascular assessment by a cardiologist or specialist physician, including results of resting ECG and interval Stress ECG. The report should detail:
  - Clinical status
  - Presence and control of risk factors—for example, hypertension, smoking, hyperlipidaemia (total cholesterol, LDL and HDL)
  - Assessed risk of any acutely disabling cardiovascular event.
- The result of recent renal function tests, including 24 hour urine protein excretion.
- Certification that the applicant has completed and understood a course of diabetic management education.

There are no specific requirements for applicants who have impaired glucose tolerance or impaired fasting glycaemia where these conditions have not progressed to frank diabetes mellitus. However, CASA advises DAMEs to counsel affected applicants on the potential aeromedical certification consequences of their progression to frank diabetes mellitus and to initiate or refer them for appropriate clinical management.
Medical Certification of Persons with Diabetes Mellitus

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

Requirements for medical (re-)certification are set out in the following paragraphs.

1. Persons with diabetes mellitus controlled by diet may receive medical certification at Class 1, 2 or 3 provided they meet the following criteria:
   - Evidence of stable blood glucose control:
     - Glycosolated Haemoglobin (HbA1c) taken within one month of assessment <7.5%.
     - Satisfactory reports as detailed under Other Investigations
   - Absence of complications that could result in sudden or subtle incapacitation when exercising the privileges of a licence.

2. Persons with diabetes mellitus controlled by diet and oral hypoglycaemic drug(s) may receive unlimited medical certification at Class 2 or 3 levels only. Such persons who seek Class 1 (re-)certification may be offered (re-)certification with an ‘as or with co-pilot’ restriction. Prior to their (re-)certification, CASA requires objective evidence that these applicants meet the following criteria:
   - No unacceptable side effects from drugs
   - Evidence of stable blood glucose control
     - No episode of symptomatic hypoglycaemia during the preceding 12 months
     - Glycosolated Haemoglobin (HbA1c), taken within preceding month <7.5%
     - Satisfactory reports as detailed in the previous section, Other Investigations
   - Absence of neurological, cardiovascular, ophthalmological, renal or other complications of diabetes mellitus that could result in sudden or unpredictable incapacitation when exercising the privileges of a licence.

3. Persons with diabetes mellitus who require insulin treatment do not meet the mandatory medical standards and are not fit for medical certification. However, in appropriate cases, the Director of Aviation Medicine may exercise discretion and issue a Class 2 medical certificate endorsed with the conditions ‘as or with co-pilot only’ and ‘valid in Australian airspace only’. Prior to such certification, CASA requires:
   - Evidence of stable blood glucose control
     - No episode of symptomatic hypoglycaemia requiring intervention by others in the preceding 12 months
     - Serial Glycosolated Haemoglobin (HbA1c) estimations at two month intervals over the preceding 6 months—all results <7.5%
     - Satisfactory reports as detailed in the previous section, Other Investigations
Absence of neurological, cardiovascular, ophthalmological or renal complications of diabetes that could result in sudden or unpredictable incapacitation when exercising the privileges of a licence.

**Special Glucose Level Monitors**

Individuals with diabetes mellitus who receive aeromedical (re-)certification must possess and use a memory chip glucose meter for ambulatory blood glucose monitoring. The meter, together with a readily absorbable source of glucose, must be carried by the applicant while exercising the privileges of a licence. (When real-time ambulatory glucose monitoring becomes readily available in Australia, CASA may require this form of monitoring instead of monitoring with memory chip glucose meters.)

**Change in Treatment**

When an applicant’s oral hypoglycaemic medication is changed, or when its dosage is changed, he or she must not exercise the privileges of an aviation licence until the attending medical practitioner supervising the medication is satisfied that he or she is again stable and a DAME has recertified his or her fitness in accordance with CASA’s relevant medical standards.

**2.4.5 Thyroid Disorders**

The major aeromedical concern accompanying thyroid disease is the potential for abnormally high or low levels of thyroid hormone to affect an applicant’s cognitive function. Thyroid tumours have the potential to cause local symptoms or to metastasise to critical locations.

**Investigation**

Clinical suspicion of thyroid disease should be confirmed by appropriate investigations. These may include various imaging techniques, the use of fine needle biopsy, and biochemical thyroid function studies. CASA requires the results of thyroid function tests to establish that applicants are euthyroid prior to consideration for medical (re-)certification.
Medical Certification of Applicants Suffering from Thyroid Disorders

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. Requirements for medical (re-)certification are set out in the following paragraphs.

Goitre

Persons with goitre are acceptable for medical certification provided that there is no evidence of thyroid dysfunction nor of vascular or airways obstruction.

Hypothyroidism

Persons who are hypothyroid may be medically certificated provided Thyroid Function Tests (TFTs) demonstrate that adequate replacement therapy has been instituted and control maintained. TFTs should be performed annually for the first three years following initial diagnosis and periodically thereafter, as determined on a case-by-case basis, with serial results submitted with requests for medical re-certification.

Hyperthyroidism

Persons diagnosed as suffering from hyperthyroidism may be recertified once they are stable after surgery/isotope treatment/stable on medication and TFTs demonstrate that they are euthyroid. TFTs should be performed annually for the first three years after treatment is instigated and periodically thereafter, as determined on a case-by-case basis, with serial results submitted with requests for medical re-certification.

Thyroid Cancers

Thyroid cancer is disqualifying under Civil Aviation Regulations (1988). Persons diagnosed with thyroid cancer are obliged to refrain from performing licensed duties until they have been reviewed by CASA and a clearance to resume duties has been issued. While prognosis for cancer depends on many factors, in most cases of thyroid cancer CASA will require documentation of successful removal of the tumour, completion of any subsequent radiotherapy, and the absence of metastatic disease before considering an applicant for (re-)certification. Under certain circumstances, conditional certification may be offered to pilots suffering metastatic disease.

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1 These factors include the type of cancer, the stage of disease when discovered, the aggressiveness of the individual cancer, cell type, the types of treatment available, co-existing diseases and the general health of the individual.
2.4.6 Gout/Hyperuricemia

Gout and hyperuricaemia arouse aeromedical concerns because of the potentially incapacitating effect of acute symptomatic gout, and of the potential for high serum levels of uric acid to lead to symptomatic urolithiasis.

**Investigation**

Clinical suspicion of gout/hyperuricaemia should be confirmed by appropriate investigations, which may include estimations of serum uric acid levels and of urinary excretion rate. CASA will require the results of these investigations prior to considering an affected applicant for medical (re)certification. In the event that an applicant with gout suffers from abdominal pain, he/she should be investigated to exclude renal stone.

**Medical Certification of Applicants Suffering from Gout/Hyperuricaemia**

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

CASA will certificate applicants with gout/hyperuricaemia when the condition is satisfactorily controlled (either by diet or by allopurinol) and has been asymptomatic for at least one month. Applicants should not exercise the privileges of a licence when being treated with colchicine.

2.4.7 Hypothalamic and Pituitary Disorders

**Pituitary Adenoma**

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

Persons with pituitary adenoma will be assessed as unfit. Subsequent medical certification will depend on considerations of residual tumour, effects of raised intracranial pressure, any pressure effects on the optic chiasm, the effects of surgery or other treatment, the effects of any hormone excess or deficiency, and the effects of any drug therapy. In some instances, an applicant may be certified with restrictions and appropriate surveillance following special medical assessment. Annual review, including reports from an endocrinologist or specialist physician and from an ophthalmologist, will be required.
2.4 Endocrinology

Diabetes Insipidus

On diagnosis, inform the CASA Aviation Medicine Section and advise the applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

This condition is marked by polyuria resulting from failure of vasopressin secretion. Fluid deprivation tests are diagnostic. Treatment is with vasopressin or one of its analogues. After the treated condition has been stable for a minimum of six months, applicants may be medically certificated with restrictions and appropriate surveillance. All such cases require special medical assessment, and CASA will determine aeromedical certification, when appropriate, on a case-by-case basis.

2.4.8 Adrenocortical Disorders

Disorders of adrenocortical metabolism have the potential to incapacitate or impair the ability of a pilot or ATC to perform duties. In addition, the underlying causes of adrenocortical disorders may themselves have significant aeromedical implications.

Medical Certification of Persons Suffering from Adrenal Disorders

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

- Aeromedical disposition will depend on cause and nature of adrenal disorder. Each applicant will be considered on a case-by-case basis and full documentation will be required. Applicants should be clinically stable and adequately treated clinically for a minimum of three months before being considered for certification.

- Cushing’s Syndrome secondary to malignancy or ectopic ACTH secretion is disqualifying. Applicants with other causes may be certificated once the underlying disease has been effectively treated and hormonal status has returned to and been maintained within normal range for a minimum of three months.

- Applicants with Addison’s disease may be certificated once their underlying disease has been effectively treated and their endocrine status has returned to and been maintained within normal range for a minimum of three months.
2.4.9 Parathyroid Disorders

Parathyroid disorders and associated disorders of calcium metabolism have the potential to impair a person’s ability to control an aircraft or to act as an Air Traffic Controller. Hyperparathyroidism leading to hypercalcaemia increases the risk of renal stone formation, peptic ulcer, mental changes and cardiac arrhythmia. (Hypercalcaemia due to malignancy should be excluded in such cases.) The less common hypoparathyroidism, if associated with hypocalcaemia, may cause disabling neuromuscular irritability and abdominal cramps.

Investigations

Prior to (re-)certification of an applicant with parathyroid disease, CASA requires a report from an endocrinologist or specialist physician and copies of pre- and post-management serum calcium and PTH levels\(^2\). If the applicant has suffered abdominal pain, CASA requires the results of imaging performed to exclude renal stones. Histology reports of specimens and the results of investigations to exclude underlying malignancy will assist in determination of the applicant’s fitness for medical (re-)certification.

Medical Certification of Persons Suffering from Parathyroid Disorders

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

- Applicants with hyperparathyroidism due to parathyroid adenoma may be (re-)certificated without condition(s) three months after surgical removal of the adenoma, provided that hormone and calcium levels have returned to and been maintained at normal levels. Hypercalcemia due to malignancy must be excluded. Full clinical details are required.

- Applicants with hypoparathyroidism may be (re-)certificated when estimation of hormone and calcium levels demonstrates that they have been stable on treatment (calcium and/or Vitamin D analogues) for at least three months.

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\(^2\) Note that poor venepuncture technique may lead to spurious PTH and calcium results.
2.4.10 Hyperlipideamia

Hyperlipidaemias are an important risk factor for the development of coronary artery disease, stroke and heart failure, which are important potential causes of in-flight incapacitation. Control of lipid levels is an important mechanism for reducing the risk of in-flight incapacitation due to vascular mishap. Similar considerations apply in the case of ATC staff.

Investigation

Blood for lipid estimation (including total cholesterol, HDL, LDL and glucose) should be drawn after fasting—that is, after the applicant has had nothing to eat or drink except water for 12-14 hours. Abstinence from alcohol for several days prior to the test may lower triglycerides levels. Dietary changes in the few days before testing have little effect on lipid levels.

Medical Certification of Persons Affected by Hyperlipidaemia

- Persons with elevated cholesterol/triglyceride levels controlled by dietary means and/or nutritional supplements are not of medical concern to CASA.
- CASA is primarily concerned over the potential for lipid lowering drugs to cause side effects of aeromedical significance. CASA will certificate pilots (both Class 1 and 2) or ATCs taking any of the lipid lowering drugs currently available on prescription in Australia, provided the applicant tolerates the medication well and experiences no significant adverse side effects. A minimum of one month of ground testing is required before the applicant returns to flying/controlling duties.
- Lipid estimation is part of CASA’s cardiovascular risk management program. Should a Class 1 or Class 3 medical certificate holder be found to have an annual risk of cardiovascular event greater than 1% (currently a score of 15 or more points on CASA’s cardiovascular risk assessment tool), he/she will be required to undergo a stress ECG per CASA protocol.
2.4.11 Obesity

Obesity, defined for CASA’s purposes as a BMI >35, is of medical concern because:

- It is an independent risk factor for the development of vascular disease
- The physical dimensions of the obese person may reduce a pilot’s ability to manipulate an aircraft’s controls safely, or to escape in the event of an accident or incident.

**Investigation**

Applicants who have a BMI >35 must be assessed by a DAME, who is to seek evidence of other pathology secondary to the obesity. Obese pilots will be required to demonstrate their ability to control an aircraft safely and to escape in the event of an emergency as part of their certification assessment. This may involve undertaking a CASA directed operational flight/ground check.

**Medical Certification of Obese Applicants**

Obesity per se is only of concern to CASA from an air safety perspective if an applicant suffers from another aeromedically significant disease or condition secondary to the obesity or his/her physical dimensions affect the safe exercise of the privileges of a licence. Such applicants will be assessed on a case-by-case basis. Obese applicants who are otherwise well and can exercise the privileges of a licence safely will be certificated without restriction.

2.4.12 Anorexia

Adult applicants with a BMI <18.5 may suffer from an eating disorder. Prior to certification, a DAME should assess them to exclude such disorders. See section 2.6 Psychiatry.

2.4.13 Appetite Suppressants

CASA will not authorise pilots to fly or ATCs to perform ATC duties when taking any appetite suppressant medication.
2.5 Neurology

2.5.1 Introduction

This section on neurological disorders outlines some of the major categories of neurological diseases that are commonly encountered and indicates their aviation medical significance.

2.5.2 Nervous System Standard – CASR Part 67

CASR 67 The nervous system standards are found in the following paragraphs of CASR Part 67:

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2.5.3 Headache

Nearly all applicants have experienced headache. The diagnosis of primary headaches are not discrete and the different types should be considered to be part of a continuous spectrum ranging from Muscular Tension Headache at one end to Classical Migraine at the other. Secondary headaches from other conditions eg, Cranial Neuralgia, Temporal Arteritis should be considered separately.

When considering primary headaches it is important to assess the history according to:

- **Speed of onset:** Is there warning eg, aura or no warning?
- **Period of prodrome:** seconds, minutes or hours?
- **Frequency:** isolated or recurrent, if recurrent how often. Time off work is a useful guide.
- **Neurological symptoms:** aura (crippling or just perceived), photophobia, visual changes, paraesthesia, paralysis, dysphasia etc.
- **Severity:** need for acute and intensive intervention such as parenteral opiate analgesics, degree of incapacitation such as need for bed rest vs ability to continue complex tasks.
- **Treatments and their effectiveness:** How effective prophylaxis if used. Type of acute treatment used eg, Tryptins and speed of response and any significant side effects.
- **Precipitating factors:** such as diet, oral contraceptive etc and effect of avoidance or withdrawal of such factors.

Since objective investigations will most usually negative, a detailed history is essential.

The best history is obtained at first presentation.

**Migraine**

For strict diagnostic purposes, migraine is an acute but reversible transient cerebral vascular insufficiency phenomenon and headache is not necessary the most important component. When the vascular insufficiency effect predominates it should be distinguished from transient ischaemic attacks. In the worst case migrainous stroke can occur where the implication for flight duties is similar to that for stroke.

Beware of Atypical Migraine without headaches.

In common usage, the term migraine may refer to any headache, but there are two main types — common migraine and classical migraine.
Common Migraine (Migraine without Aura)

More than 80% of migraine sufferers experience "common" or "non-classical" migraine, which is not associated with sharply defined neurological disturbances.

It is often a label used for Tension Headache perceived to be of significant severity by the patient. Careful history will avoid the diagnosis of migraine with its implication vs. Tension Headaches.

Diagnosis of "nonclassical" migraine depends on:
- Detailed history of headaches
- Usually an absence of significant neurological symptoms.

Treatment usually does not include parenteral opiates or specific migraine drugs such as vascular active agents.

Classical Migraine

Classical migraine is accompanied by any transient focal neurological and/or vascular phenomena that may include:
- Unilateral headache
- Hemiparesis, Hemiplegia
- Retinal/Occipital phenomena, such as visual disturbance of various degree and scotomata
- Basilar artery phenomena
- Autonomic symptoms of nausea, vomiting etc.

Such migraines have variable periods of remission and rate of onset, and may completely incapacitate the sufferer. There is no universal exclusion of medication. Significant side effect should be explored and their presence or absence documented.

Adverse factors for aeromedical certification include:
- Sudden significant neurological symptom such as loss of vision, weakness and incoordination with no warning
- Failure or of prophylactic treatment with frequent attacks
- Requirement for intensive treatment
- Short prodrome that does not allow effective use of acute treatment before symptom onset.

The Aviation Medicine Section considers all cases individually.
Cluster Headache

Cluster headache is a subgroup of vascular headaches where the frequency of occurrence has a characteristic “cluster” nature. Aeromedical certification assessment considerations are similar to those for migraine. The details of history required are the same.

Other Types of Headache

Tension (Muscle Contraction) Headache

This category of headache can assume the nature of a vascular headache with a pulsating quality when it is severe and is often confused with migraine.

It includes headaches occurring secondary to other conditions that gave rise to muscular tension, e.g. eyestrain, cervical pathologies, psychiatric conditions in which management of the underlying cause is of prime importance.

Chronic tension headaches that require treatment such as anxiolytics or other drugs likely to cause a decreased state of alertness or diminished performance require specialised assessment.

Cranial Nerve Headache

The commonest of these conditions is trigeminal neuralgia. This may be idiopathic or secondary to underlying disease. Irritation of the nerve may be relieved by surgical intervention, which requires specialised neurosurgical assessment. Consideration must be given to the risk and implication for certification associated with any neurosurgery. The side effects of medications commonly used in its treatment include diminished judgement and diminished depth perception. Relevant history should be elicited and documented.

The Aviation Medicine Section assesses all cases individually.

Local Cranial Disease

Temporal arteritis

This condition need not be disqualifying if controlled, particularly when steroid therapy has been ceased. Full specialist reports are required for assessment.

Adverse factors associated with it include loss of vision and intracerebral involvement with significant functional sequelae.

The Aviation Medicine Section assesses all cases individually.
2.5.4 Blackouts, Loss of Consciousness and Syncope

These words are often used interchangeably by both laymen and medical professionals. A detailed description is more informative than the label. It does not necessary describe loss of consciousness (LOC) but can be used to mean an altered state of consciousness, vertigo or even psychiatric disturbance such as fugue-like states. Causes can be primarily neurological, secondary to cardiovascular pathology, gastrointestinal upset, physiological or even be specific to aviation causes such as G induced loss of consciousness.

History of the event is paramount in differentiation of the causes. The applicant should be directed to relive the experience in his/her own words, without prompting. Only when that is established should more direct questions about the circumstances before, during and after the event be asked. The patient’s account of sensations should be elicited. Observer history should be obtained if available. If uncertainty exists, record the uncertainty rather than introduce attempts at explanation. Such factual records allow further independent evaluation where necessary. The value and accuracy of the history deteriorates with time and repetition of recounting.

Specific features that will help in differentiating the physiological system involved are:

- **Prodrome:** absence or present.
- Posture at the time of the episode.
- **Period:** ie, duration of attack.
- Postictal orientation.
- Activity before, immediately and within 24 hr preceding.
- Head trauma.
- Frequency.
- Urinary incontinence.
- Tongue biting.
- **Observer report:** confirmation of patient’s account, particularly concerning convulsive movements. Time course to any convulsive movement is important ie, did it occur at the same time as LOC, or seconds later?
- **Bystanders’ action:** eg, promptly placing patient in prone or coma position, or keeping patient sitting/upright.
- Family and/or past history.
- Known cardiovascular history or risks.
- History of infection such as recent viral infection that may support labyrinthitis.
Depending on the historical features elicited, the need for referral to relevant specialist/s can be determined. If the cause is primarily neurological, refer to neurologist or neurosurgeon for clarification. For possible cardiovascular causes, cardiologist opinion should be sought. Where the history suggests vestibular problem, ENT opinion will be appropriate.

The Aviation Medicine Section assesses all cases individually.

**Concussion**

The term should be restricted to brief LOC in the setting of blunt head injury with no demonstrable intracranial injury. The emphasis is on the brief duration, which should be in the order of 5 minutes or less. If the event accords with these criteria and no sequelae are reported, it is generally of no significance for aeromedical certification. An exception is made for repeated concussions such as occur in boxers.

**Transient Global Amnesia (TGA)**

The cause of TGA is uncertain. It may be first warning of TIA. Current theory considers it to be a transient, migraine-type of vascular phenomenon. The condition should be distinguished from epilepsy, particularly complex partial epilepsy and symptomatic intracranial tumours.

Relapse can occur and may be precipitated by exercise, coitus, or exposure to water. A period of observation is necessary to monitor relapses. Risk of relapse is 30% and can recur once or twice. Where frequent attacks are present, other diagnoses should be considered.

The condition is benign and affected applicants can be aeromedically certificated following a suitable period of observation. Neurological reports are required in all cases and follow up reviews may be necessary.
2.5.5 Disorders of Equilibrium

**Benign Positional Vertigo**

This is a true rotational sensation accompanied by nystagmus, occurring only on change of head position. It is usually idiopathic or secondary to head trauma. Its course is variable. Assessment is based on the frequency of occurrences, their duration and severity.

**Acute Peripheral Vestibulopathy (Vestibular Neuronitis and Acute Labyrinthitis)**

Diagnosis implies temporary unfitness to fly. If the condition settles without recurrence, a return to unrestricted flying may be permitted after three months.

**Menière's Disease and Acute Recurrent Positional Vestibulopathy (ARPV)**

In these conditions, vertigo usually lasts for hours and often causes chronic disequilibrium. Menière's disease and ARPV have high recurrence rates. Applicants with these conditions are usually unable to meet the standard for certification, but require individual assessment.

**Alterbaric Vertigo**

In this condition, vertigo occurs on change of air pressure, often after a forceful Valsava manoeuvre to clear the ears. Oscillopsia and nystagmus may accompany it.

Occasionally this condition is due to chronic eustachian tube compression (e.g. by hypertrophied adenoids) and may thus be surgically correctable. Recurrent cases are assessed individually.

**Momentary Vertigo**

This is generally considered to be benign unless there is evidence that it significantly affects the applicant.

**Non-Functioning/Hypo-Functioning Labyrinths**

This condition is characterised by unsteadiness of gait, by loss of orientation (particularly in the dark) and by inability to maintain accurate visual fixation while in motion. It is often secondary to aminoglycoside administration. The degree of functional impairment should be fully investigated for decision by the Aviation Medicine Section.
Vestibular Imbalance

Applicants with this condition may experience feelings of unsteadiness on rapid change of position. It is generally benign and a "pass" assessment may be issued.

Multisensory Dizziness

This is a chronic condition of loss of balance or feeling of light-headedness in persons with multiple sensory disorders, such as a combination of two or more of:
- Peripheral neuropathy
- Vestibular imbalance
- Visual impairment
- Cervical spondylosis, and
- Hearing loss.

Multi-sensory dizziness is assessed according to the degree of disability present.

Note: Drugs used to control dizziness and vertigo often produce drowsiness. Control of these symptoms by drugs with such side effects is not acceptable for pilot or ATC medical certification. See also Section 2.13 Medication – Drugs and Flying/Controlling
2.5.6 Seizure Disorders

General

The tendency towards epileptic seizures is not an “all or nothing” phenomenon. Most people, under certain conditions, may have a seizure if sleep deprived or withdrawing from alcohol or benzodiazepines, especially if in addition they are taking medications that decrease the seizure threshold (e.g. tricyclic antidepressants). Approximately 2% of the population have a seizure during their lifetimes.

Following a single seizure, an adult has a 30-40% chance of recurrence. Those with a distinct epileptiform abnormality on the EEG, in the setting of a history of seizure, as opposed to non-specific abnormalities, have an increased risk of further seizures.

Diagnosis

It is imperative that there be an accurate diagnosis of the type of seizure. The importance of a description of the event cannot be overemphasised. While a useful diagnostic tool, any EEG must be reviewed by an experienced reader and must be evaluated in the context of the clinical history. It is not a useful sole diagnostic or screening tool.

The important components to the diagnosis are:

- More than one event, except Post Traumatic Epilepsy (PTE) for which one event will establish the diagnosis
- Must be unprovoked.

Video-EEG confirms the diagnosis but is not easily available as it is time consuming and difficult to organise except in academic research facilities.

Aeromedical certification considerations

A detailed history and specialist neurologist opinion is essential. Provoking factors must be considered. Their absence suggests a poor prognosis.

Significant adverse factors are:

- Unavoidable concomitants of aviation eg, strobe lights, propeller flicker, fatigue
- Difficult to avoid eg, menstruation.

Provoking factors that are avoidable or insignificant in context of aviation are:

- Alcohol excess and/or withdrawal
- Sleep.
These should be considered with regards to risk of occurrence in the absence of such factors.

Individuals with established epilepsy, ie, more than one unprovoked attacks, are unfit for aviation medical certification. Persons who have experienced seizures but who are not diagnosed as epileptic may be deemed to meet the medical standard.

**Partial (Simple or Complex) Seizures without progression to Generalise Seizures**

The term Partial Seizure often misleads patients to consider the condition is not as significant as the classical Grand Mal Seizure. Careful counselling of patients should include the explanation that such terms are anatomical and electro-physiological distinctions. The functional effect of impaired conscious state and/or brain activity is equally as significant as in other epilepsy.

**Sleep (Nocturnal) Epilepsy**

Epilepsy that occurs only when asleep is distinguished from sleep disorders such as Sleep Behaviour Disorder, Sleep Apnoea etc. Such disorders must be excluded. Sleep EEG recordings—best with video recording (if possible), will confirm the diagnosis.

The condition is associated with increased risk of seizure when awake ie, progression to the more “classical” type of epilepsy. This risk is increased when the condition is untreated.

Since aircrew and air traffic controllers are not performing flight-related duties when asleep, sleep as a provoking factor is not relevant in the aviation context. When the condition responds to anticonvulsants, the risk of such a seizure during flight related duties is further reduced.

Prior to certification, the effect of anticonvulsant control failure or “breakthrough” must be considered. Expert neurological opinion should be sought to determine if such a control failure occurs. The first presentation may be recurrence of sleep epilepsy or epileptic seizure whilst awake. Recurrence that first presents as fits whilst awake poses a flight safety hazard.

Aviation Medicine Section assesses all cases individually.

Important indicators of less risk are:

- No further occurrence of sleep epilepsy
- Absence of significant side effects of anticonvulsant.
Childhood Seizures

Childhood febrile seizures that are brief, not associated with neurological deficits and have ceased before the age of five are not generally disqualifying. The applicant must have been off all anti-epileptic medications for at least five years and the off-medication EEG, should be normal.

The seizures of Benign Rolandic Epilepsy of Childhood usually involve the face, tongue or hand and are often precipitated by drowsiness or sleep. The EEG shows significant abnormalities from the Rolandic area. Individuals with this condition may be considered for certification if they have been seizure free and off medication for ten years. They must have a normal neurological examination and EEG. A sleep deprived EEG should also be obtained and must be normal prior to issue of any aviation medical certificate.

Petit Mal or Juvenile Myoclonic Epilepsy is seizure disorders that occur in childhood. Because such conditions may persist into or present during adulthood, they are considered as subtypes of epilepsy. These conditions are associated with a risk of progression to generalised convulsions.

The Single Epileptiform Seizure

Extreme care must be taken to diagnose epileptic seizure in the presence of a single event. Clonic movements from transient brain hypoxia or from other causes are often reported as seizures. The condition should be considered as Loss of Consciousness (see above section on Blackouts, Loss of Consciousness and Syncope). Non-epileptic causes should be sought and excluded.

An individual with a single epileptiform seizure is initially unfit for medical certification. A case may be reconsidered five years from a seizure if the following conditions are met:

- Specialist neurological examination is normal
- Repeated EEGs, including sleep-deprived EEGs, do not reveal any significant abnormalities
- Studies incorporating additional nasopharyngeal or minisphenoidal electrodes, if relevant, do not reveal any significant abnormalities
- Neuro imaging, preferably by MRI, has demonstrated normal brain structure.

For continued medical certification five years after initial certification or recertification, all of the above investigations must be repeated and reported as normal. Applicants for Class 1 certification may be restricted to "as or with co-pilot" for a further two years. Individuals who have a second seizure are considered to have epilepsy.
When a single seizure was related to alcohol withdrawal, applicants may be considered for medical certification earlier if they have a normal EEG and Neuro imaging, and psychosocial and biochemical evidence is presented that their alcohol abuse is in a continuing "recovery" phase. The alcohol abuse should be dealt with as a separate medical problem.

Those who have had a seizure while on tricyclic antidepressant drugs or other seizure enhancing medications should be considered more prone to seizures than the average population. Both neurological and psychiatric opinions should be sought to manage their interrelated problems. Psychiatric report should indicate the optimum treatment required and if alternative treatment is suitable and/or available. The neurological report should indicate the applicant's risk of further seizures, particularly if using other psychotropic medication for psychiatric treatment.
2.5.7 Head Injuries

There are two major concerns over fitness for aviation-related duties following head trauma. One is the neuropsychological consequence of the trauma in applicants who have not had any clear focal deficits and the other is the possibility of Post Traumatic Epilepsy (PTE).

The neuropsychological consequences are secondary to the effects of acceleration/deceleration forces on the skull and brain. Because of the anatomy involved, these forces cause their greatest focal damage to the orbital, frontal and anterior temporal areas of the brain. Diffuse white matter damage may be associated with the cortical damage.

The result of such injury is dysfunction in a number of functional executive activities of the brain. Frequent effects include:

- Slowing of reaction time, impaired memory and decreased ability to maintain a high level of performance over time, particularly in settings of complex activities and choices,
- A high propensity for further mental decline with fatigue, and
- Other problems include maintaining attention, initiation and proper sequencing of tasks, difficulty in planning and anticipating, and difficulty in establishing automatic responses to a trigger.

The affected individual may not notice or care that the task is being poorly performed. Stress, fatigue and pain may exacerbate all these effects, and the handling of simultaneous emergency tasks is particularly affected.

Although the effects of head trauma may be severe, routine IQ and mental status testing may be within normal limits. Fortunately there is a natural tendency for neurological deficits to improve with the passage of time. There are a number of ways to predict the outcome of a head injury. The most commonly used is the duration of post-traumatic amnesia (PTA). Serial sequential neuropsychological tests separated by months or years can document changes associated with improvement of neurological deficit. A pre-trauma baseline test of such nature will provide the ideal reference but is not usually available. The limitations of neuropsychological testing should be recognised eg, learning; subjective interpretations by the tester, interface issues (particularly if computer-based) and its results should be interpreted with these limitations in mind.
Mild Brain Injury

This is characterised by:

- Transient loss or alteration of consciousness without any focal neurological deficit and with rapid return to alertness and orientation
- Post-traumatic amnesia (PTA), which occurs when a person is conscious but ongoing events are not recorded in the memory. The duration of this lapse must be less than one hour; and
- Post-traumatic syndrome (PTS) which comprises a symptom complex involving:
  - Dizziness
  - Emotional impairment
  - Intellectual impairment, and
  - Headache.

Applicants with mild brain injury are generally considered to be fit to fly unless there is a history of PTS, which takes more than six months to resolve.

Any alteration of consciousness associated with head trauma is a sufficient indicator of likely brain injury that flying should not be undertaken for at least two weeks — the period during which "early" post traumatic epilepsy is most likely to occur.

Even in the absence of other risk markers or of a neurological deficit, a more prolonged loss of consciousness and its associated post-traumatic amnesia should be followed by longer periods of suspension from aviation related duties, as follows:

| PTA < 1 HR | 1 month |
| PTA 1 HR - 24 HRS | 3 months |
| PTA > 24 HRS | At least 1 year |

In all cases, formal confirmation of neurological fitness should precede a return to flying and referral to the Aviation Medicine Section for a final decision is required.

Moderate and Severe Brain Injury

The significant factors in the assessment of head injuries, which produce moderate or severe brain injury, are:

- Extent and nature of any neurological deficit
- Risk of post-traumatic epilepsy (PTE).
2.5.8 Post-Traumatic Epilepsy Markers

A past history of febrile convulsions in childhood and/or a family history of epilepsy doubles the risk associated with any other markers.

Early post-traumatic epilepsy that occurs within the first week following injury carries a 25% risk of later epilepsy. Convulsive movements that accompany an impact head injury do not increase this risk. However, any convulsive activity following the immediate effects of impact, however shortly thereafter these occur, should be considered as "early post-traumatic epilepsy".

Demonstrated haemorrhage within the brain substance, particularly the cortical part, is associated with 25-45% risk of PTE. Depressed fractures or presence of blood in the subarachnoid space are not reliable guides to risk of PTE. However, the presence of such findings should alert investigators to search for bleeding within the brain substance.

Both CT scan and MRI are desirable in assessment of such bleeding. Availability dictates which test is performed. MRI has the advantage of being able to grade breakdown products from blood and can be very sensitive for late imaging where no initial CT or MRI was performed. Where possible an initial CT and/or MRI should be performed. If the history suggests a severe head injury and no initial imaging available a MRI should be performed to detect residual changes associated with bleeding within the brain substance.

A normal MRI should be reassuring.

Other markers are the presence or absence of a post-traumatic amnesic interval of more than twenty-four hours, focal signs, and early post-traumatic epilepsy.

Once the first post-traumatic week (the period of early PTE) has passed, the risk of subsequent PTE decays exponentially. By two years, the residual risk is less than 20% of that immediately post-injury and at four years it is less than 10% of that initially present.

When considering recertification, a residual risk of PTE of 1% or less is acceptable, given that the prevalence of epilepsy in the community is 0.33%.

Conditions that require careful assessment and which most commonly result in a "fail" assessment are: epilepsy, intracerebral haematoma, persisting CSF fistula, primary open cerebral laceration, and the presence of any significant permanent neurological deficit.
Recertification Guidelines

The Aviation Medicine Section applies the following guidelines:

1. Applicants with PTA lasting 30 minutes or less, who after the event have a normal neurological examination and no sequelae, may return to full duties in three to four months if the CT scan is normal.

2. Applicants with PTA from 30 minutes to 24 hours, with a normal MRI and EEG, are acceptable after 12 months. If a seizure occurred in the first week after trauma in an adult, a longer interval before re-licensing is required. Such cases are assessed individually.

3. If there is PTA greater than 24 hours, but Neuro imaging and neuropsychological testing are normal, applicants can be declared fit after two years. Flight simulator testing may provide additional valuable information in these cases.

4. Applicants with head injuries associated with intracerebral haemorrhage or focal deficit, whose neuropsychological testing does not show significant sequelae at 5-7 years post trauma, may return to duties after 7 years. Those who demonstrate abnormal neuropsychological sequelae have been more seriously injured and are considered individually. MRI is essential to determine presence or absence of bleeding.

5. Use of an anticonvulsant may mask the presentation of any PTE. The duration of the seizure free period should be considered as beginning only when applicant is off anticonvulsant medication. Where the risk of further seizures is considered to be too high to cease medication, the applicant is not medically fit for certification.

2.5.9 Neurosurgery

Opening the skull is not necessarily a permanently disqualifying factor for flight crew or ATC certification.

Assessment is based on:

- The underlying disease and its prognosis
- Any neurological deficit
- Surgical approach and any associated induced injury to the brain substance along the approach path
- Any risk of post operative epilepsy secondary to destruction or removal of cerebral tissue
- Location of the supratentorial/infratentorial lesion.

Full reports are required in all cases. DAMEs should issue a "doubtful" assessment and provide explanatory notes.
2.5.10 Cerebrovascular Diseases

These pathologies are usually secondary to or associated with other medical conditions and these should be sought and controlled besides dealing with the presenting cerebrovascular events. Investigations are more informative regarding the causes than the history alone. Imaging by CT scan, MRI or Angiography will differentiate the various types. Other investigations such as lipid profile, stress test for coronary ischaemia, ultrasound of carotid and heart, digital subtraction angiography etc should be considered to address non-cerebral conditions. The treatment of these non-cerebral pathologies may introduce factors affecting aeromedical certification, eg, use of an anticoagulant.

Specialist neurologist assessment is mandatory. Opinion should specifically include the risk of:

- recurrence
- epilepsy
- subtle or acute incapacitation.

Such assessment should be supported by reference to current literature with reasoned opinions.

Where subtle functional changes are suspected, neuropsychological testing to quantify the changes should be undertaken. These tests can be expensive and are open to varying interpretations.

Ischaemia

Assessment of transient ischaemic attacks (TIAs) and reversible ischaemic neurological deficits (RINDs) depend upon their causes.

- **Stenosis.** Although stenotic lesions may be bypassed or treated by endarterectomy, the risk of continuing TIAs and cerebral infarction remains high.

- **Embolism.** The risk of recurrent embolism or of haemorrhage secondary to anticoagulation is high.

- **Postural.** Individual assessment is required, but most instances are related to head movements necessary for flying.

- **Vascular headache.** See earlier section on Headache.

- **Blood hyperviscosity.** This condition may be due to polycythaemia, myelomatosis, Waldenstrom's macroglobulinaemia, etc. These cases are assessed individually and usually result in "fail" assessments if the hyperviscosity cannot be controlled.

- **Hypertension.** If adequate control is established with the use of suitable drugs, these applicants may be considered fit.
All precipitating or associated pathologies should be addressed and separate reports relevant to them included.

Aviation Medicine Section assesses all cases individually.

**Haemorrhage**

There are two major types of cerebral bleeding:

- Intracerebral haemorrhage, producing cerebral infarction
- Subarachnoid haemorrhage.

Most cases are secondary to leakage or rupture of an aneurysm; some are secondary to arterio-venous malformation. Surgery to treat them may cause injury to brain matter with associated post-operative epileptic risk. Details of the surgery should be included in reports.

20% have no identifiable cause but may be related to sustained hypertension or to transient elevation of blood pressure.

All affected patients are at risk of later developing normal pressure hydrocephalus with visual field loss and corresponding subtle incapacitation. This possible complication should be looked for and excluded as part of the follow up of all affected applicants.

Aviation Medicine Section assesses all cases individually.

**Cerebral Infarction**

Applicants who have suffered a cerebral infarct are generally considered unfit for at least one year. Recertification depends on:

- Underlying pathology leading to the stroke
- Absence of neurological deficit
- Risk of recurrence
- Assessed risk of future seizures.
2.5.11 Infections of Central Nervous System

**Meningitis**

All applicants diagnosed with meningitis should not engage in flight duties for six months. Return to flight duties depends on the nature of the infecting agent or cause of meningitis, eg, viral, bacterial or fungal, and the degree of recovery of resultant deficit and risk of development of epilepsy or hydrocephalus.

**Encephalitis**

This is dealt with as for meningitis.

**Brain Abscess**

Assessment is based on the underlying cause and whether the lesion is:

- Supratentorial, in which case the risk of epilepsy and the degree of deficit must be considered, or
- Infratentorial, where the nature and degree of deficit must be considered.
2.5.12 Degenerative Disease

Dementia

Dementia is defined as deterioration in cognitive abilities that impair the previously successful performance of activities of daily living. The examining doctor is in a better position to assess an applicant with possible dementia if there has been contact over some years and changes over time can be more readily appreciated.

Memory loss, particularly short term, is most common and tends to affect executive function. (Planning, initiation and regulating behaviour for systematic, goal-directed activity. It is highly involved in novel situations where long term memory “experience” is not adequate).

In the aviation medical examination, presentation of dementia tends to occur at early stage in the process, with consequently difficult diagnosis. Pathologies that cause secondary dementia should be sought and excluded before a diagnosis of primary dementia is made. Age of onset is not a reliable guide. With aging, frequency of all pathology increases. Dementia, primary or secondary, is one of the many manifestations of increasing age. In the absence of pathology, even advanced age is not a reason for refusal of medical certification.

In early dementia, diagnosis usually is made by exclusion. Where a positive finding is present eg, brain atrophy on CT scan, the diagnosis is more likely. However, the absence of such findings does not preclude the diagnosis. Investigations should be guided by pathologies that produce secondary dementia.

Clinical examination can be formal or informal. Abnormal performance of tasks such as form completion, or following simple instruction such as undressing should be recorded. Mini-Mental State Examination has limitations because of its dependence on the applicant’s linguistic ability, educational level and cultural background, particular in the early and late stages of the condition. Other reasons for poor test performance should be carefully considered before the result deemed positive. If test performance is normal, the presence of dementia is unlikely.

The greatest diagnostic challenge occurs where formal tests appear normal yet a family member or the examiner’s prior knowledge of the applicant indicates the presence of changes in mentation sufficient to cause concern. A flight performance report from instructors should be sought. Formal flight test may be necessarily. Assessment of flight performance must take account of the pilot’s experience and currency. Highly experienced pilots may perform adequately even when mildly impaired. Comparison with previous performance or with that of other pilots’ with similar experience should be sought.

Many dementias are progressive but some may be static. Where dementia has been demonstrated to be progressive, an immediate "fail" assessment is likely.
2.5 Neurology

Note: If dementia is secondary to metabolic disease or correctable organ failure, there may be significant recovery of mental function following effective treatment. Aviation Medicine Section assesses all cases individually.

Normal Pressure Hydrocephalus

Treatment is not effective in preventing progression and subtle incapacitation may develop even in the presence of a working shunt. Assessment will be "fail".

2.5.13 Extrapyramidal Disease

Parkinsonism

This is characterised by:

- Rigidity
- Bradykinesia
- Tremor—although a "resting" tremor eases with movement, stress may produce a "reversal" with worsening of tremor on movement.

Parkinsonism can be a manifestation of other diseases and such causes should be sought and dealt with. Parkinson’s disease is a chronic, progressive disorder of primary Parkinsonism with no evidence of more widespread neurological involvement.

The functional effects of Parkinsonism can be variable. A careful record of neurological deficits, including effect on common activities, should be made. This will serve both as a quantitative appraisal tool and for comparison in evaluating subsequent progression of the condition.

A flight test is an essential component of evaluation. It should be the last of the tests performed and does not replace clinical assessment.

Applicants may be assessed as fit for certification if there is no adverse effect of treatment such as postural hypotension or "on-off" phenomena, and if the following features are adequately controlled:

- Bradykinesia
- Rigidity
- Tremor
- Adjustment of centre of gravity
- Voice quality
- Rapid scan eye movement.
Significant sequelae relevant to aviation safety include:

- Altered colour vision
- Dementia (late phenomenon)
- Depression (early as reaction to diagnosis, or later as a primary phenomenon)
- “On-off” phenomenon: abrupt but transient fluctuation in clinical state within the day, often as complication of levodopa therapy.

Progression to incapacitating symptoms or signs is generally slow. Shortened validity of certification is required to facilitate monitoring of changes. Class 1 certificate holders may require 6-monthly review and restriction to duties ‘as or with co-pilot’. All classes of medical certificate holders will require neurological review at least annually.

Applicants receiving treatment who display "on-off" phenomena will not be certificated to continue flight duties due to the likelihood of rapid onset of incapacitation within the time period of a typical flight.

### 2.5.14 Demyelinating Disease

**Multiple Sclerosis (MS)**

MS is characterised by multiple episodes of demyelinating attacks within the central nervous system. Diagnosis cannot be made following a single attack unless confirmed by MRI changes. A single attack with a single lesion on MRI does not confirm the diagnosis. Multiple lesions in the clinical setting of single attack may be consistent with the diagnosis.

The course of the disease can be relapsing-remitting or progressive. In the relapsing-remitting type some patients may remain static for many years while some will relapse at variable frequency. Favourable prognostic features are: isolated optic neuritis or other sensory change, complete recovery, age of onset younger than 40 years, female, fewer than two relapses in the first year of illness and minimal impairment five years after the first presentation.

Progressive type of MS has a 50% probability of functional deficit in daily life activities requiring assistance at 10-15 years from initial diagnosis.

Typical attacks in mild cases have onset over days rather than minutes. However in severe cases, attacks can present as an acute neurological event. Seizure is uncommon.
In all cases, assessment depends upon:

- Nature of symptoms
- Time between exacerbations
- Residual deficit
- Likelihood of sudden incapacitation
- Activity of the disease.

A flight test may be necessary to determine the effect of any residual deficit.

All cases of MS require formal neurological opinion. Aviation Medicine Section assesses all cases individually.

Any subsequent certification will require regular specialist reviews.
2.5.15 Intracranial Tumours

(See also Section 2.14 – Malignancy.)

Three factors affect the aeromedical disposition of applicants with intracranial tumours:

- Malignant or benign
- Treatment modality: chemotherapy, radiotherapy, surgery
- Degree of brain involvement.

Certification of applicants with secondary malignant brain tumours is principally a function of the characteristics of the primary tumour.

Certification of applicants with primary malignant brain tumours depends on prognosis in terms of malignancy and sequelae of any treatment received.

Certification of applicants with benign brain tumours depends on tumour size and location and the effect of any treatment.

**Radiotherapy**

Whole brain irradiation may be associated with late radiation injury effects. Focal irradiation may cause residual changes demonstrated on MRI. Such complications should be monitored for and excluded.

**Chemotherapy**

Systemic effects have to be considered in any aeromedical assessment.

**Surgery**

Effects occur regardless of the tumour’s malignancy. For tumours within the brain, aeromedical concerns are for brain substance loss, with associated neurological deficit, and surgically induced bleeding into brain substance, with associated post-“traumatic” epilepsy.

Essential factors for consideration are:

- **Site of tumour**: supra or infratentorial
- Surgical approach
- Details Of The Surgery: amount of intraoperative bleeding, retraction and compression of brain, and any intraoperative difficulties or complications.
The treating neurosurgeon’s report and opinion on the risk of epilepsy is a mandatory requirement for aeromedical assessment and must include:

- Details of any neurological deficit from brain substance loss or as result of surgical approach
- Risk of epilepsy
- Risk of recurrence of tumour.

Benign tumours not involving brain substance such as meningioma or acoustic neuroma should be considered in terms of:

- Treatment used: radiation and/or surgery
- Severity of compression effect on underlying neural structure: brain or nerve. In respect to brain compression, the potential for epilepsy should be considered.

A report from the specialist involved is required in all cases.

The effect of different treatment combinations and their likely sequelae requires expert neurological opinion on the particular therapy.

If there is no significant neurological deficit, these applicants may be assessed as fit for pilot and ATC duties. Applicants with small tumours, with no significant deficit after treatment by cryotherapy, after which there has been no evidence of epilepsy, may be assessed as meeting the required medical standard or as posing no significant risk to the safety of air navigation.

Applicants with history of childhood cerebellar astrocytoma who have been cured and who have no deficit or history of epilepsy may be assessed as meeting the required medical standard or as posing no significant risk to the safety of air navigation.

For adult subtentorial tumours, Aviation Medicine Section assesses all cases individually.

Nasal approach to pituitary tumours has a low risk of sequelae; the primary aeromedical consideration is endocrine effect and any residual compression effect on the optic nerves.

Malignant tumours fully excised, with or without associated radiotherapy, are considered according to their potential for recurrence, effect of the treatment, and their associated seizure risk. Those treated by radiotherapy alone will require long period of observation, usually in order of years, before the condition can be considered cured. Early certification is unlikely.

Applicant with benign tumours treated by radiation alone will be considered individually, dependent on the siting and any residual pressure effects on surrounding structures.

Benign intraventricular tumours will be considered individually, with any neurological deficit resulting from the surgical approach the main consideration.
2.5.16 Extracranial Neurological Disease

*Peripheral Nerve Diseases*

These disorders are assessed on the basis of the nature and degree of deficit. Autonomic involvement may produce syncope and is generally regarded as incapacitating. Full reports are required.
2.6 Psychiatry

2.6.1 Introduction

This section details the assessment procedures for pilots, other aircrew members and air traffic controllers (ATC) who suffer or who may suffer from psychological disorders or psychiatric disease.

The aim of the psychiatric assessment within the aeromedical examination is to ensure that applicants do not suffer from psychological disorders or psychiatric disease which places them at an increased risk of incapacitation, which may produce a decrement in psychological or higher cortical function, or which may jeopardise the safety of air navigation. A particular concern is the potential for an affected individual to commit an unsafe act that impairs the safe operation of an aircraft.

When conducting the aeromedical examination, the DAME should recognise that an individual who holds an unrestricted medical certificate must be capable of safely performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities (either as a private or a professional pilot) may include flight:

- For prolonged duration, often as part of a shift roster
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning
- Subject to disrupted sleep and time zone changes.

A number of these stressors may also affect Air Traffic Controllers.
2.6.2 The Psychiatric Standard – CASR Part 67

The psychiatric standards are found in the following paragraphs of CASR Part 67:

<table>
<thead>
<tr>
<th>CASR 67</th>
<th>Description</th>
<th>Relevant Paragraphs</th>
</tr>
</thead>
</table>
| CASR 67.150 | For medical standard 1 | CASR 67.150(7)  
Table 67.150  
3.4 – 3.6 |
| CASR 67.155 | For medical standard 2 | CASR 67.155(7)  
Table 67.155  
2.4 – 2.6 |
| CASR 67.160 | For medical standard 3 | CASR 67.160(7)  
Table 67.160  
3.4 – 3.6 |
2.6.3 Psychiatric Assessment

All applicants for Australian aviation medical certificates are required to complete a comprehensive screening questionnaire, to be physically examined by a DAME, and to undertake a number of screening tests.

When conducting the psychiatric component of the aeromedical examination, the DAME should note the presence of relevant risk factors for the development of psychiatric disease and the presence of signs and symptoms suggestive or diagnostic of such conditions. (A Generic Template for an Aviation Psychiatric History is being developed to guide the conduct of an aviation medical psychiatric assessment and will be provided in due course.)

For example, risk factors for the development of alcoholism include:

- Family history of alcohol abuse
- Family or work stresses
- Financial pressures
- Single marital status.

Psychometric testing may assist in making a psychiatric diagnosis and referral to a consultant psychiatrist may be indicated to confirm a diagnosis or to resolve concern over a differential diagnosis. CASA may require a pilot or an ATC to be assessed by a consultant psychiatrist as part of its consideration of an applicant’s fitness for aeromedical certification.
2.6.4 Documentation of Psychiatric Conditions

Psychiatry is a subjective science. DAMEs need to take a careful and thorough clinical history before reaching a psychiatric diagnosis, particularly a diagnosis that may have significant occupational implications for pilots or ATCs. The Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations is provided to assist DAMEs in taking such a history and to bring consistency to their reporting.

In addition to requiring a traditional narrative report of psychiatric illness in aviators, CASA will henceforth require DAMEs and consultants to classify psychiatric conditions in aircrew and ATCs in accordance with the criteria defined in the Diagnostic and Statistical Manual of the American Psychiatric Association (DSM IV). Use of the DSM system will provide CASA with a tool to ensure the uniform assessment of all aircrew and ATCs diagnosed with psychiatric disease and allow CASA to make an informed assessment of the aeromedical risk posed by a particular applicant with a psychiatric condition.

DSM IV categorises psychiatric disorders and disease along several axes:

- **Axis I** - Clinical syndromes
- **Axis II** - Developmental Disorders/Personality Disorders
- **Axis III** - Physical Disorders and Conditions
- **Axis IV** - Severity of Psychosocial Stressors
- **Axis V** - Global Assessment of Function¹.

The first three axes constitute the diagnostic assessment of a patient with a psychiatric condition. Conditions in Axis I (and to a lesser extent Axis II) are those most likely to be of aeromedical concern in the flying safety context. Axis III permits the clinician to indicate any current physical disorder or condition that is potentially relevant to the understanding or management of the case. (These are disorders or conditions listed outside the mental disease section of ICD 10).

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¹ CASA does not require an Axis V assessment. An amended assessment scale for assessing function in Aviators is under consideration.
Axis IV provides a scale for coding the overall severity of the psychosocial stressor(s) acting upon the patient that have occurred in the year preceding the current evaluation and that may have contributed to the development, recurrence or exacerbation of a mental disorder. The rating of severity of the stressor should be based on the clinician’s assessment of the stress an “average” person in similar circumstances and with similar socio-cultural values would experience from the particular stressor(s). Clinicians should also make an assessment as to whether the stressors are acute (less than 6 months) or enduring (greater than 6 months).

Axis V permits the clinician to indicate an overall judgement of a person’s psychological, social and occupational functioning (as an aviator or ATC) on a scale that assesses mental health-illness. Two ratings should be made using this scale; the first an assessment of current function and the second an assessment of best function during the preceding 12 months.

Thus, for example, a DAME reporting on an airman with psychiatric illness may summarise his condition as follows (in addition to providing a narrative of the situation):

Axis I: Major depression: single episode, severe, without psychotic features  
Alcohol dependence

Axis II: Dependent personality disorder

Axis III: Alcoholic cirrhosis of liver

Axis IV: Stressors: anticipated retirement; grounded by company; change of residence; loss of contact with friends

Axis V: (Not required by CASA at present.)
2.6.5 Disorders Diagnosed in Childhood

**Mental Retardation**

This disorder is characterised by significantly sub-average intellectual function with concurrent deficit or impairment in adaptive functioning. Onset is before the age of 18 years. Where the results of standardised, individually administered intelligence tests indicate significant reduction in an applicant's intellectual performance likely to limit the individual's ability to control an aircraft and where clinical assessment indicates a deficit in adaptive behaviour, CASA will not issue a medical certificate.

**Learning Disorders**

Learning disorders are diagnosed when an individual's achievement on individually administered, standardised tests in reading, mathematics or written expression are substantially below that expected for age, schooling and level of intelligence and when such deficits interfere with academic achievement or activities which require such skills. CASA will not issue a medical certificate to an applicant who has a learning disorder that precludes the acquisition of knowledge and information essential to safe flight.

**Motor Skills Disorders**

The essential feature of this group of disorders is a marked impairment in the development of motor coordination sufficient to interfere with academic achievement of activities of daily living. Recognition of this disorder usually occurs in childhood. Clinical course in variable, and in some cases, lack of coordination continues through adolescence into adulthood. In general, CASA will not issue a medical certificate to an applicant who suffers an impairment of motor skill sufficiently severe to threaten the safety of flight.

**Communication Disorders**

CASA will not usually issue a medical certificate to an applicant who suffers a communication disorder severe enough to compromise effective communication in the aviation environment. Practical testing may be required to establish the effectiveness of an applicant's communication abilities.
Pervasive Development Disorders

These disorders are characterised by severe and pervasive impairment in several areas of development relative to an individual’s developmental level or mental age. Autistic Disorder is the commonest of these disorders. The essential features of an individual with this disorder are impairment in reciprocal social interaction (which is gross and sustained), impairment in communication skills and markedly restricted repertoire of activity and interests. The symptoms and characteristics of autism can present in a wide variety of combinations, from mild to severe.

Other conditions in this group include Rett’s Disorder, Asperger’s Disorder and Childhood Disintegrative Disorder.

Sufferers of disorders in this group will usually be precluded from holding CASA medical certification.

Attention Deficit/Hyperactivity Disorder (ADD/ADHD) and Disruptive Behaviour Disorders

This disorder is amongst the most common neuro-developmental disorders found in children. Its hallmarks are hyperactivity, impulsiveness and inattention beyond the norm for a child’s age. There may be wide variations apparent in the severity of this disorder. Other psychiatric conditions frequently co-exist in children suffering ADD/ADHD. While the diagnosis is reliable if made to the criteria outlined in DSM IV, concerns over the validity of the diagnosis in a particular individual are frequently expressed. Sufferers of ADHD/ADD are significantly more likely to be involved in motor vehicle and industrial accidents (whether on pharmacological treatment or not) than similar groups of individuals who do not suffer from this condition(s).

Aeromedical concerns relate to the capacity of a sufferer of ADD/ADHD to safely control an aircraft and to the potential adverse effects of amphetamine medications frequently utilised to treat this condition. To consider an application for aeromedical certification from a sufferer of ADD/ADHD, CASA requires a thorough assessment of the applicant by a consultant psychiatrist (to confirm the diagnosis against the criteria indicated in DSM IV and exclude other conditions) and the results of neuropsychological testing. Where evidence exists of persisting deficiencies in cognitive ability, behavioural aberrancy or where an applicant requires continued use of amphetamine medication, the applicant will not be aeromedically certificated.

Refer to the Criteria for the Diagnosis of ADD/ADHD.
Conduct Disorder (Antisocial Personality Disorder of Childhood)

The essential feature of conduct disorder is a repetitive and persistent pattern of behaviour in which the basic rights of others or major societal norms or rules are violated. CASA will not usually consider certification for a medical certificate to an applicant with a substantiated history of conduct disorder.

Oppositional Defiant Disorder

The major feature of this condition is a recurrent pattern of negativistic, defiant, disobedient or hostile behaviour towards authority figures that often develops gradually in childhood and may continue into adolescence and even into adulthood. CASA will not usually consider medical certification for an applicant with a substantiated history of oppositional defiant disorder.

Tic Disorders

A tic is a sudden, rapid, recurrent, non-rhythmic, stereotyped motor movement or vocalisation. Tics may be simple or complex, may exist in isolation or be part of a condition such as Tourette’s Syndrome. Where an applicant's tic is believed to have implications for the safety of air navigation, CASA will not issue a medical certificate. Sufferers of Tourette’s Syndrome will usually be precluded from holding medical certification.
2.6.6 Delirium and Dementia

**Delirium**

Delirium is a disturbance of consciousness, accompanied by a change in cognition that is not due to pre-existing or evolving dementia. The disturbance generally develops over a short period, and often fluctuates during the course of a day. There is generally evidence from the clinical assessment of the aetiology of the delirium which may be due to a general medical condition, substance intoxication/withdrawal, use of medication, toxin exposure or a combination of these factors.

Aviators and ATCs with acute delirium should immediately be stood down/stand down from flying or controlling duty. CASA will only consider aeromedical certification once the applicant has recovered from the delirious state, and the underlying cause of the delirium has been identified and remedied.

**Dementia**

Dementias are characterised by the development of multiple cognitive deficits (including memory impairment and one or more of the following cognitive disturbances: aphasia, apraxia, agnosia, or a disturbance of executive functioning). While dementias share a common symptom presentation they may be differentiated on the basis of aetiology.

It may be difficult to make a diagnosis of early dementia in an individual who has enjoyed a well paid and responsible position in the aviation community for many years, but who is finding it impossible to learn new skills and to retain them (e.g. changing aircraft type). Anxiety or mood disorders may co-exist. Sympathetic handling and possibly psychological evaluation may prove helpful and the latter may be necessary to exclude or establish a diagnosis of pre-senile dementia. In such cases the decision about medical certificate revalidation will need to be based upon a very careful evaluation of all clinical and occupational information.

Once an applicant demonstrates a significant impairment of memory and other cognition, he/she should refrain from exercising the privileges of the pilot or ATC licence. CASA will not usually issue an aviation medical certificate to a sufferer of dementia.
2.6.7 Mental Disorders due to medical conditions not classified elsewhere

Reserved.

2.6.8 Substance Related Disorders

This group of disorders includes disorders related to the problematic use of a drug, including non-prescription medications, prescribed medications and drugs of abuse (e.g. alcohol, cocaine), other substances (e.g. volatile solvents) and to toxin exposure. For CASA purposes, this classification does not include nicotine abuse disorder. Some prescription drugs, whilst legally prescribable, are inappropriate when used by pilots or ATCs in the aviation environment (e.g. MS Contin). The safety of medications is dealt with in Section 2.13 Medication – Drugs and Flying/Controlling. The substance related disorders are divided into two major categories: the substance use disorders (abuse and dependence) and the substance induced disorders (substance induced intoxication, withdrawal, delirium, dementia, amnesia, psychosis, anxiety, mood, sexual dysfunction and sleep disorders). CASA will not usually issue an aviation medical certificate to a pilot or ATC who suffers a substance abuse disorder or who is involved in the problematic use of drugs.

**Drug Testing**

Current CASA practice is to ask all applicants for aeromedical certification (original and renewal), about possible problematic use of drugs and substances. DAMEs should also look for evidence of drug or substance use/abuse in their assessment of applicants.

Applicants who admit to the problematic use of drugs/substances or whom the DAME suspects of drug/substance abuse on the basis of other history or examination findings are required to submit a urine sample for drug screening. Urine samples for drug testing purposes should be provided as part of and at the time of the DAME medical certificate examination and should be passed under the direct supervision of the DAME. The sample should then be split into two clean containers and each sealed, the applicant being offered his/her choice of samples for independent testing. The other sample is to be forwarded to the testing pathology laboratory by the DAME. Under no circumstances is this sample to be given to the applicant. Urine drug testing required by CASA is to undertaken at the applicant's expense.

As a minimum, urine samples should be tested for the following groups of drugs: cannabinoids, amphetamines, cocaine analogues, hallucinogens, opiates, sedatives and phencyclidine analogues. In addition, the requesting DAME should request testing for any other drug/substance that he/she suspects that the applicant may be using/abusing.

Any applicant who returns a positive urine drug screen and thus confirms his/her problematic use of drugs/substances does not meet the relevant medical standard. CASA will not issue a medical certificate unless an explanation acceptable to CASA is provided.
Alcohol Abuse/Alcoholism

A number of alcohol related syndromes are described:

- **Acute intoxication** with alcohol is a concern in the aviation workplace by virtue of the way in which it impairs psychomotor performance that may potentially lead to accidents and injury. The potential for catastrophic outcomes in the aviation environment arguably render it impossible to consider any episode of acute intoxication in a pilot on duty as “uncomplicated”. Current CARs provide specific requirements on “bottle to throttle time” for pilots and ATCS and it is intended that the new CASRs, when published, will limit the blood alcohol concentration of pilots and ATCs.

- **Harmful use of alcohol** is associated with damage to the physical or mental health of the individual; in the absence of a diagnosis of the alcohol dependence syndrome. Certain specific and severe consequences of alcohol misuse may also be diagnosed separately – notably alcoholic hallucinosis, Korsakoff’s psychosis and alcoholic dementia.

- The **alcohol dependence syndrome** is a cluster of biological, psychological and social phenomena that may be diagnosed where three or more of the following features are identified during the preceding year:
  - A strong desire/compulsion to drink
  - Difficulties in controlling drinking
  - A physiological withdrawal syndrome associated with abstinence
  - Increased tolerance to alcohol
  - Neglect of other activities due to drinking
  - Persistence of drinking despite harmful consequences.

- **Alcohol withdrawal** is associated with mild to severe symptoms, including sweating, nausea, tremor and anxiety. However, it may be associated with serious complications, including convulsions or delirium (“delirium tremens”).

- An isolated **drink driving offence** does not fulfil ICD-10 criteria for harmful use of alcohol (although it does fulfil DSM-IV criteria for alcohol abuse) and CASA will generally not take action in response to a single episode of PCA. However, such offences do indicate an increased probability that other alcohol related problems might be identified, and this probability increases still further where there have been multiple drink-driving offences committed.

*Note*: The FAA prohibits the medical certification of pilots who are convicted of two or more drink-driving offences within a 3-year period.
Medical Assessment

The experience of certain major airlines and licensing authorities is that success in rehabilitation of the alcohol dependent pilot can best be achieved by early intervention and treatment, adhering to the strict protocol outlined below. By using this program it has been possible to return aircrew to active flying within four months.

- **Immediate action.** A pilot or air traffic controller must be assessed as temporarily unfit on reasonable suspicion of:
  - intoxication whilst on duty
  - harmful use of alcohol
  - alcohol dependence
  - other alcohol related problems.

Such an assessment may be taken by the airline’s own medical officer, by the DAME or by CASA, or by a member of flight crew or operations staff.

Where a pilot is thought to be intoxicated whilst on duty, particular care and sensitivity are required and the specific action taken may depend, in part, upon the company drug and alcohol policy. However, where possible, it is important to obtain an objective assessment of the alleged intoxication at the earliest opportunity. This might involve use of a breath alcoholmeter, a blood alcohol analysis or urinary drug testing. Such procedures may only be conducted with the patient’s consent. Given that blood alcohol concentration falls fairly rapidly with abstinence, such testing should be conducted as soon as possible. Refusal of testing, and any reasons given for this, should also be recorded carefully. A period of less than 4 hours between detection and testing is considered usual.

- **Treatment and rehabilitation.** If psychiatric opinion and examination confirm “alcohol abuse with or without dependency”, then a residential in-patient program is a mandatory requirement if revalidation is to be considered. The treatment program undertaken should be directed by the treating psychiatrist and may or may not include pharmacotherapy.

Where the diagnosis is considered not to constitute “alcohol abuse with or without dependency” but where there is still a degree of concern regarding an alcohol related matter, then a less intensive treatment may be indicated. For example, such treatment may comprise a day-patient program, or outpatient counselling. The circumstances in which this may be offered must be a matter of judgement. (Arguably, heavy drinking as a cause of an elevated GGT or hypertension, but without any other complications or problems, might be an example of such circumstances.)
2.6 Psychiatry

- **Follow-up and monitoring.** DAMEs or CASA should be advised as soon as treatment is considered necessary so that follow-up review may be arranged to commence immediately following discharge from in-patient care. The patient should be reviewed immediately after discharge from in-patient care and on-going review should be at 3 monthly intervals (or more frequently if indicated) for at least 2 years, and less frequently thereafter. Overall monitoring should continue for not less than 3 years and in most cases will continue virtually indefinitely, or until the pilot retires. This is because of the significant risk of relapse, which continues for many years following treatment. Review will require supportive, corroborative evidence of continuing abstention from the family, the family doctor and from others in close contact at home or in the workplace. At each review blood tests should be repeated as support for the monitoring process (see above).

Continued attendance at Alcoholics Anonymous or an equivalent organisation is required in most cases. It is also desirable that a peer group member on the same aircraft fleet should act as a “buddy” to supervise the individual’s progress and report to the relevant authority at intervals.

- **Treatment goals.** Total abstinence will usually be the only acceptable treatment goal. For less serious cases (e.g. an elevated GGT with no other evidence of problems arising from alcohol consumption), an attempt at controlling drinking may be allowed, and in such circumstances in-patient treatment will not be required. However, this will be the exception rather than the rule and, in cases of doubt, in-patient treatment and abstinence should both be considered essential for recertification.

- **Certification.** At the end of the first four months of treatment, and provided that abstention is secure, the pilot may be allowed to resume his/her flying role but only in a multicrew capacity. A period of at least two years multicrew limitation will be required, assuming good progress, before solo operations will be authorised. Failure to enter the program or to maintain the protocol will lead to continued suspension of the medical certificate.

- **Recidivism.** Recidivists will usually be disqualified from holding an aviation medical certificate and will not be considered for further certification.
Reinstatement of Aeromedical Certification

Applicants who are disqualified from holding an aviation medical certificate as a result of problematic use of drugs/substances (including alcohol) may subsequently be certified at any class provided they meet the following requirements:

a. The applicant completes a detoxification program (if relevant to the management of the drug/substance condition—eg, alcoholism)

b. The psychiatrist/drug rehabilitation specialist managing the applicant’s case assesses the applicant and provides a report confirming the applicant’s abstinence and prognosis

c. The applicant enters a program of random drug testing/performance assessment at the direction of CASA to confirm continued abstinence.

d. The applicant enters an appropriate peer support program

e. The applicant is regularly reviewed by a psychiatrist/substance abuse specialist and a report is provided to CASA 6 monthly (in the first year).

Applicants will not usually be granted medical certification within 12 months of diagnosis/disqualification for substance abuse. Applicants who have been treated for alcohol related conditions may be considered for medical certification 4 months after detoxification is complete.

Recidivism

Recidivists will usually be disqualified from holding an aviation medical certificate and will not be considered for further certification.
2.6.9 **Schizophrenia and Psychotic Disorders**

These disorders are grouped together as they frequently include psychotic symptoms as a prominent aspect of their presentation (“psychotic” refers to an “inability to test reality” as evidenced by the presence of delusions, prominent hallucinations, disorganised speech, disorganised or catatonic behaviour).

An established history of schizophrenia or psychotic disorder is an absolute contraindication to aeromedical certification of pilots and ATCs. Occasionally aircrew who can unequivocally be established to have experienced a temporary psychotic episode which, has ceased and is reasonably expected never to recur (e.g. psychosis secondary to an organic, toxic or metabolic cause) may be considered for certification. In such cases, certification will be based on psychiatric and other expert advice on the risk of recurrence.

Applicants and licence holders rarely inform CASA when they are diagnosed with schizophrenia or other psychotic illnesses. Such individuals may have little insight into their illness and may attempt to continue flying/controlling. DAMEs and other medical practitioners who are aware of a patient who holds a pilot or ATC licence and who is suffering from a psychotic illness should immediately notify CASA’s Aviation Medicine Section and, where appropriate, notify the medical certificate holder that this is being done. While this may be personally difficult, the risk posed to the safety of the public as well as to the individual by a psychotic medical certificate holder or applicant is such that notification of CASA is entirely appropriate. The Civil Aviation Regulations and the Civil Aviation Safety Regulations indemnify any medical practitioner who acts in good faith in such circumstances.
2.6.10 Mood Disorders

**Major Depression**

Major depressive disorder is characterised by a clinical course involving one or more episodes of major depression without a history of manic, mixed or hypomanic episodes. Major depressive disorder may have an extremely variable course with some patients experiencing episodes of severe depression separated by long periods without depressive symptoms of any sort, while other patients are entirely debilitated by their almost unrelenting condition. At least 60% of individuals who have a single episode of severe depression will experience further episodes, and 90% of individuals who have had three episodes of severe depression will have subsequent episodes. A significant aeromedical concern is the high mortality associated with this condition, as up to 15% of patients with major depression die by suicide.

However, major depression is also commonly relatively mild in its manifestation and readily treated. Assessment of the aviation risk is thus problematic and is based on considerations such as the worst state the patient has experienced during an episode and the suicide/homicide risk during their worst state. The presence of a significant risk at any time during the course of a depressive illness will be disqualifying for pilots and ATCs. A specialist psychiatric opinion should be sought in any case where there is uncertainty about patient status.

**Bipolar I Disorder (Mania with/without Major Depression)**

The essential feature of this disorder is a clinical course characterised by the occurrence of one or more manic episodes or mixed episodes. More than 90% of individuals who have an episode of mania will go on to have future episodes. Such individuals frequently suffer one or more episodes of major depression or other psychiatric co-morbidities. Completed suicide occurs in 10-15% of such patients.

Bipolar disorder is disqualifying for pilots and ATCs.

**Bipolar II Disorder (Hypomania with Major Depression)**

The essential feature of this disorder is a clinical course characterised by the occurrence of one or more major depressive episodes accompanied by at least one hypomanic episode.

Bipolar disorder is disqualifying for pilots and ATCs.
Cyclothymic Disorder (Numerous Brief Episodes of Hypomania and Minor Depression)

The essential feature of cyclothymic disorder is a chronic fluctuating mood disturbance involving numerous periods of hypomanic symptoms and numerous episodes of depressive symptoms over a period of years (where neither hypomanic nor depressive symptoms are severe or prolonged enough to meet diagnostic criteria for a manic depressive episode). Cyclothymic disorder usually begins insidiously in adolescence and has a chronic indolent course into adulthood. Approximately 15% of sufferers will subsequently develop Bipolar I or II disorder.

Dysthymic Disorder (Prolonged Minor Depression without Mania/Hypomania)

The essential feature of dysthymic disorder is a chronically depressed mood that occurs on most days for several years. Affected individuals describe themselves as being chronically sad or “down in the dumps”. During periods of depressed mood, additional symptoms of depressed appetite, sleep disturbance, low energy levels, low self-esteem, poor concentration and feelings of helplessness may be present. Up to 75% of patients with dysthymic disorder will develop major depression within 5 years.

Pilots and Air Traffic Controllers with dysthymic disorder will not be certificated while they are symptomatic. On remission of symptoms, successfully treated applicants with a good prognosis may be certificated on the basis of a report from a consultant psychiatrist that indicates that the applicant is in remission and at low risk of behaviour that may compromise aviation safety.
Use of Antidepressant Medication by Depressed Pilots and Air Traffic Controllers

CASA may, on a case-by-case basis, certificate applicants who are prescribed (and are taking) the antidepressant medications Sertraline, Citalopram and Venlafaxine as treatment for their depression. CASA is reviewing the antidepressant Moclobemide for possible approval for use by aviators and ATCs. An “as or with co-pilot” or “with direct air traffic controller supervision” condition, as appropriate, may be imposed. Pilots and ATCs taking other types of anti-depressants will not usually be considered for certification.

CASA certification of pilots and ATCs taking CASA authorised medications is conditional on:

- Such applicants being under the care of a medical practitioner experienced in the management of depression—the applicant must:
  - Be stable on an established and appropriate dose of medication for at least four weeks before returning to flying/ATC duties and exhibiting:
    - Minimal acceptable side-effects
    - No drug interactions or allergies
  - Be subject to clinical review monthly or more often, with progress reports to CASA at 6 monthly intervals (for at least the first year). The applicant may be involved in other concurrent treatment (e.g. psychotherapy).
  - Have an absence of other significant psychiatric co-morbidities
  - Have no other psychoactive medications
  - Have precipitating factors removed/controlled.

- Symptoms of depression being well controlled, without evidence of psychomotor retardation

- An absence of suicidal ideation or intent

- An absence of features of arousal (e.g. irritability or anger)

- The presence of a normal sleep pattern.

Pilots or ATCs authorised to fly or perform duties when taking Selective Serotonin Re-uptake Inhibitor (SSRI) or related antidepressant medications must cease exercising the privileges of their licences if their antidepressant medication is altered or the dose changed. Their supervising medical practitioner may return them to duty when they are assessed as stable and without unacceptable side effects.

Pilots and ATCs whose medication is being reduced must cease exercising the privileges of their licences for the entire period during which they are weaned off medication plus an additional period of two weeks. Their supervising medical practitioner may return them to duty when they are assessed as stable and without unacceptable side effects.
2.6.11 Anxiety Disorders

DSM IV has eliminated the term neurosis, and dispersed the diagnoses from this former category of disorders amongst four other headings:

- Mood disorders
- Anxiety disorders
- Somatoform disorders
- Dissociative disorders.

Because panic attacks and agoraphobia may occur in the context of any anxiety disorder as well as in association with other mental disorders, they are defined separately hereunder.

Panic attacks

Panic attacks are discrete episodes in which an individual experiences a sudden onset of intense apprehension, fearfulness or terror, often associated with feelings of impending doom. During these episodes, symptoms such as shortness of breath, palpitations, chest pain or discomfort, choking/smothering sensations, and fear of “going crazy” or losing control may be present. Attacks occur suddenly, may be unpredictable and usually build to a maximum within 10-15 minutes. CASA will not usually grant aeromedical certification to an individual who suffers non-specific or unpredictable panic attacks.

Agoraphobia

The essential feature of agoraphobia is extreme anxiety about being in places or situations from which escape may be difficult (or embarrassing) or in which help may not be available in the event of having a panic attack. The anxiety typically leads to a pervasive avoidance of a variety of situations. Such avoidance may impair an individual’s ability to work or to carry out other responsibilities. CASA may grant aeromedical certification where an applicant’s agoraphobia is unrelated to the aviation environment or unlikely to affect aviation safety adversely.

Specific Phobia

The essential feature of this disorder is a marked and persistent fear of clearly discernible, circumscribed objects or situations. Exposure to the phobic stimulus almost invariably provokes an immediate anxiety response. CASA may grant aeromedical certification where an applicant’s specific phobia is unrelated to the aviation environment or is unlikely to affect aviation safety adversely.
Social Phobia (Fear of Embarrassment)

This condition is marked by a significant and persistent fear of social or performance situations in which embarrassment may occur. Exposure to such situations almost invariably provokes an immediate anxiety response and may reduce an affected individual’s ability to function in social and occupational circumstances. Most sufferers of this condition avoid these social/performance situations but some may endure such situations with dread. CASA will not usually grant aeromedical certification to an individual who suffers from non-specific or unpredictable social phobias.

Obsessive-compulsive Disorder (Obsessive Thoughts and Compulsive Rituals)

Obsessions are persistent ideas, thoughts, impulses or images that are experienced as intrusive and inappropriate and that cause marked anxiety or distress. Compulsions are repetitive behaviours or mental acts whose goal is to prevent or reduce anxiety or distress. In most cases, an individual with a compulsion feels driven to perform a compulsion to reduce the distress that accompanies the obsession or to prevent some dreaded event or situation. Eventually, the sufferer recognizes that the obsession or compulsion is excessive or unreasonable but feels powerless to prevent it. These disorders may cause marked distress, be extremely time consuming or significantly interfere with an individual’s normal social or occupational circumstances. CASA will not usually grant aeromedical certification to an individual who suffers from obsessive-compulsive disorder.

Post-traumatic Stress Disorder (Non-acute Psychological Consequences of Previous Trauma)

The essential feature of Post-Traumatic Stress Disorder (PTSD) is the development of characteristic symptoms following exposure to an extremely traumatic stressor. Such stressors include a personal near death experience, witnessing the severe injury or death of another or the violent or unexpected death of a family member. An individual’s response must involve intense fear, helplessness, or horror. The characteristic symptoms resulting from exposure to the extreme stressor include persistent re-experiencing of the trauma, avoidance of the stimuli associated with the trauma, numbing of general responsiveness and persistent symptoms of increased arousal. PTSD can occur at any age and symptoms generally begin within 3 months of the precipitating event. CASA will not usually grant aeromedical certification to an individual who is suffering from acute symptoms of PTSD. Certification may be considered once an individual’s symptoms are controlled and the applicant is considered to pose no threat to the safety of air navigation.
Acute Stress Disorder

This condition is characterised by the development of anxiety, dissociative or other psychological symptoms within one month of exposure to an extremely traumatic stressor. Generally symptoms of acute stress disorder begin shortly after exposure to the stressor, peak after 2-5 days, and resolve within a month (otherwise the diagnosis should be changed). CASA will not usually grant aeromedical certification while individual is experiencing an acute stress reaction. Once the condition has resolved, return to flying or ATC duties is likely.

Generalised Anxiety Disorder

In this disorder an individual is afflicted by excessive anxiety about a number of events or activities. The symptoms occur on the majority of days and the individual finds it difficult to control the symptoms. The anxiety and worry are accompanied by one of more of the following:

- Restlessness
- Easy fatigability
- Difficulty concentrating
- Irritability
- Muscle tension
- Disturbed sleep.

Many individuals suffering generalised anxiety disorder report they have been nervous and anxious all of their lives. The clinical course is chronic and fluctuating. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.
2.6.12 Somatoform Disorders

The common feature of this group of disorders is the presence of physical symptoms that suggest an underlying physical condition, but are not explained by that medical condition. The symptoms cause clinically significant distress or impairment in social, occupational or other areas of functioning and are not intentional.

**Somatization Disorder**

In somatization disorder, the patient experiences multiple symptoms including pain, gastrointestinal symptoms, sexual dysfunction and pseudo-neurological symptoms over several years. Characteristically, this disorder begins before the age of 30 and has a chronic fluctuating course that rarely remits completely. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Undifferentiated Somatoform Disorder**

The essential feature of this disorder is the presence of one or more physical complaints that persist for six months or longer. Symptoms include chronic fatigue, loss of appetite, gastrointestinal or genitourinary symptoms. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Conversion Disorder**

This disorder involves unexplained symptoms or deficits affecting voluntary motor or sensory function suggesting a neurological or other general medical condition. Psychological factors are judged to be associated with the symptoms or deficits. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Pain Disorder**

In pain disorder, the predominant focus of clinical attention is pain. Psychological factors have an important role in the severity, exacerbation or maintenance of this disorder. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Hypochondriasis**

This condition is the preoccupation with the fear of having, or the idea that one has, a serious disease based on a patient’s misinterpretation of bodily symptoms or functions. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.
**Body Dysmorphic Disorder**

This condition is the preoccupation with an imagined or exaggerated defect in physical appearance (in contrast to anorexia and bulimia where the morbid focus is on body weight). CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

### 2.6.13 Factitious Disorders

Factitious disorders are characterised by physical or psychological symptoms that are intentionally produced or feigned in order to assume a “sick role”. In contrast to malingering, the motivation of sufferers of factitious disorders is psychological and there is an absence of external incentive for the behaviour. Other psychiatric co-morbidities are frequently present. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

### 2.6.14 Dissociative Disorders

The essential feature of this group of disorders is a disruption in the integrated functions of consciousness, memory, identity or perception. The disturbance may be sudden or gradual in onset, and may be transient or chronic. Dissociative amnesia, dissociative fugue, dissociative identity disorder, and depersonalisation disorder are included in this group of disorders. CASA will not usually grant aeromedical certification to an individual who suffers from these conditions. Aeromedical certification may be considered should the condition resolve.
2.6.15 Sexual and Gender Identity Disorders

**Sexual Dysfunctions**

This group of disorders is characterised by disturbance in sexual desire and in the psychophysiological changes that characterise the normal human sexual response. They may cause marked distress and interpersonal difficulty. In general, these disorders are not of aeromedical concern unless the associated psychological distress intrudes on an individual’s ability safely to control and aircraft or perform duty as an ATC.

**Paraphilias**

The essential feature of this group of conditions is recurrent, intense, sexually arousing fantasies, sexual urges or behaviours involving non-human objects, the suffering of oneself/others, or the non-consensual participation of others in such activities. Affected individuals are rarely self referred and usually come to attention when their behaviour has brought them into conflict with their sexual partners, society, or has reduced on their social, occupational or other areas of functioning.

Affected applicants will not usually be aeromedically certificated until the issues that brought them to attention have been resolved. Successfully treated applicants with a good prognosis may be certificated on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.

**Gender Identity Disorders**

Patients with gender identity disorder experience strong and persistent cross-gender identification and a persistent discomfort about their assigned sex. The diagnosis depends on evidence of clinically significant distress or impairment in social, occupational or other areas of functioning.

Affected applicants will not usually be aeromedically certificated until the source of the distress or impairment is dealt with, and if appropriate, gender reassignment has been completed. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.
2.6.16 Eating Disorders

**Anorexia Nervosa**

The essential features of this condition are refusal to maintain a minimally normal body weight, intense fear of gaining weight, and significant disturbance in perception of shape/size of the body. Restrictive and binging/purging subtypes of this condition are identified. Many persons with anorexia nervosa exhibit depressive symptoms, others may be obsessive-compulsive, while others may have feelings of ineffectiveness, a strong desire to control the environment, inflexible thinking, limited social spontaneity, perfectionism, restrained initiative and depressed emotional expression. While some persons recover from anorexia completely, others have a relapsing course and the overall mortality of this condition approaches 10%.

CASA will not usually aeromedically certificate applicants who are actively anorexic. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.

**Bulimia Nervosa**

The essential features of this condition are binge eating and use of inappropriate compensatory methods to prevent weight gain. Persons with bulimia also place an excessive emphasis on their body shape. They are frequently depressed or suffer mood disorders and many also meet the criteria for the diagnosis of personality disorder. The lifetime prevalence of substance abuse disorders involving alcohol or stimulants is at least 30% among persons with bulimia.

CASA will not usually aeromedically certificate applicants while they are actively bulimic. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.
2.6.17 Sleep Disorders

**Primary Sleep Disorders**

This group of disorders includes the dyssomnias (including insomnia, hypersomnia and narcolepsy which are characterised by abnormalities in the amount, quality or timing of sleep) and the parasomnias (characterised by abnormal behavioural or physiological events occurring in association with sleep). Of primary aeromedical concern is the failure of sufferers from these conditions to gain sufficient restorative sleep to ensure optimum alertness and cognitive function when performing duties as pilots and ATCs. Applicants for aeromedical certification will only be considered if studies confirm normal alertness during waking hours (with or without treatment). (Also see Section 2.3 Medical Aspects – Respiratory Disease.)

2.6.18 Impulse Control Disorders

The essential feature of impulse control disorders is failure to resist an impulse, drive, or temptation to perform an act that is harmful to the person or to others. CASA will not usually grant aeromedical certification to individuals who are diagnosed as suffering from such disorders.
2.6.19 Adjustment Disorders

An adjustment disorder may be identified when a person, within three months of an event or stress, develops clinically significant emotional or behavioural symptoms. Such symptoms are either greater than would be generally expected, given the nature of the stressor, or lead to significant impairment in social, educational or occupational function. Stressors may be single or multiple, recurrent or continuous, and may affect either a single person or a group. Patients with adjustment disorders may experience symptoms of depression, anxiety, or may manifest disturbances of conduct. Adjustment disorders generally have a good prognosis and usually remit within six months of the stressor or its consequences ceasing.

Pilots or ATCs should not exercise the privileges of a licence whilst suffering symptoms of an acute adjustment disorder. In some cases, a medical certificate may be suspended. Once psychiatric opinion confirms that the symptoms associated with the adjustment reaction have abated and the acute stressor has been removed or overcome, CASA will usually issue an unrestricted medical certificate.

Personality Disorders

Personality disorders are characterised by enduring patterns of thought and behaviour that deviate markedly from the expectations of a person’s culture. These patterns, which usually begin in adolescence or early childhood, are pervasive, frequently inflexible, stable over time and cause distress, social impairment and often occupational difficulties. A number of specific personality disorders are identified including: antisocial personality disorder; (impulsive, aggressive, manipulative); borderline personality disorder (impulsive, self-destructive; unstable), dependent personality disorder (dependent, submissive, clinging); Histrionic personality disorder (emotional, dramatic, theatrical); narcissistic personality disorder (boastful, egotistical, "superiority complex"); obsessive-compulsive personality disorder (perfectionist, rigid, controlling); paranoid personality disorder (suspicious, distrustful); and, schizoid personality disorder (socially distant, detached), etc.

While personality traits are unique and may enable a person to excel in a particular field, individuals with identifiable personality disorders are likely to have attitudes or perform acts that may be prejudicial to flight safety. Such individuals fail to meet CASA’s psychiatric medical standards and will usually be disqualified from aeromedical certification. Certification may be considered if specialist psychiatric opinion confirms that a pilot or ATC with a personality disorder represents a low risk to aviation safety.
2.6-28

2.6.20 Other Psychiatric Conditions which may be the Focus of Clinical Attention

**Suicidal Ideation or Gesture**

Suicide and attempted suicide are not psychiatric diagnoses per se, but rather symptoms of underlying psychiatric disease. Furthermore, it is uncommon for an individual to use an aircraft as a means of committing suicide.

Those who commit suicide are more often male. The act is carefully planned, precautions taken against discovery, and the method is often violent. The majority of those who suicides are suffering from a depressive disorder, many having significant social problems, and alcohol misuse is a feature in about 15% of cases. In the younger age groups personality disorders are frequently diagnosed, because they are often associated with alcohol or drug misuse, and adverse social factors. Deliberate self-harm is usually an impulsive act, committed in such a way as to invite discovery. Over dosage with minor tranquillisers, antidepressants and non-opiate analgesics is common. Frank major psychiatric illness is uncommon.

In assessing potential risk the following factors should be considered:

- A history of direct statement of intent
- A history of previous self harm
- A previous or current depressive disorder, particularly in the early phase of recovery
- Alcohol dependence, particularly with severe physical or social complications
- Drug dependence
- Social deprivation or loneliness.

Certification may be considered if specialist psychiatric opinion confirms that a pilot or ATC who has attempted or considered suicide represents a low risk to aviation safety. Applicants who have a history of multiple suicide attempts will not usually be granted a medical certificate.
Fear of Flying

DSM IV identifies as a true simple phobia the overt, unabashed, and long-standing fear of flying which usually occurs in people who are not aviators. When an experienced aviator who previously enjoyed flying presents with “fear of flying” it may represent a complex mix of more acute causes and symptoms’ presentations. In such fearful fliers, anxiety about symbolic threats may overlay a rational fear of actual risks; this may represent a reaction to a near or actual accident, or displaced anxiety from a personal crisis. If the flier is not consciously aware of the fear, the focus may be on vague or trivial somatic symptoms, presented in a setting of "I'd like to fly, but—." This attitude presents a striking clinical contrast to the more usual tendency of fliers to understate, if not actually deny, signs and symptoms that they believe may disqualify them from medical certification.

An episode of spatial disorientation or of hyperventilation in flight may trigger intense symptoms of anxiety. Loss of motivation to fly may undermine previously adequate means of coping with the true dangers of flight, particularly in professional aviators. An accident involving the flier or a friend may overwhelm mental defences against such a possibility. Interpersonal conflicts with significant individuals in a non-aviation setting (home, office) may precipitate aviation-related anxieties without any obvious connection to flying except the time of onset.

Whatever its genesis, CASA will not medically certificate a pilot who suffers symptomatic fear of flying until its causes are delineated and the fear has been successfully treated.
2.7.1 Introduction

This section details the assessment of pilots, other aircrew members and Air Traffic Controllers (ATC) who suffers or who may suffer from renal disease or from urological disorders.

The aim of the renal assessment within the aeromedical examination is to ensure that applicants do not suffer from renal or urological conditions which place them at an increased risk of incapacitation or which may produce a decrement in physiological or psychological function sufficient to jeopardise the safety of air navigation. In conducting the aeromedical examination, the DAME will recognise that an individual who holds an unrestricted medical certificate must be capable of performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities may include flight (either as a private or professional pilot):

- For prolonged duration, often as part of a shift roster
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning, and
- Subject to disrupted sleep and time zone changes.

A number of these stressors may also affect ATCs.
2.7.2 Urinary Standard – CASR Part 67

The urinary standards are found in the following paragraphs of CASR Part 67:

- **CASR 67.150** For medical standard 1
  - CASR 67.150(7)
  - Table 67.150
  - 1.19 – 1.22

- **CASR 67.155** For medical standard 2
  - CASR 67.155(7)
  - Table 67.155
  - 2.18 – 2.21

- **CASR 67.160** For medical standard 3
  - CASR 67.160(7)
  - Table 67.160
  - 3.17 – 3.20

2.7.3 Dipstick Testing

**Haematuria**

Urinary ‘dipstick’ testing is required as part of the routine aeromedical examination to screen for the presence of haematuria. Approximately 2-5% of the population have microscopic haematuria, but only about 0.5% who are under age 70 will have a urinary tract cancer as the cause. A positive dipstick test should be repeated, and if negative, managed expectantly. (Most of these applicants will have a minor glomerular lesion.)

Initial aeromedical management of an applicant with a persistently positive dipstick test involves obtaining phase contrast microscopy of a fresh mid-stream urine sample. The sample must be examined within two hours of being passed; thus individuals more than two hours from a suitable pathology service must travel to a location that has that capability. Because of wide variation between laboratories in reporting urine abnormalities, CASA’s relevant requirement for a ‘normal’ assessment in an applicant found to have microscopic haematuria is for three separate urine tests, all of which have less than 20,000 RBC per ml. Phase contrast microscopy of specimens with crenated cells up to 10,000 per ml, indicating a glomerular origin, are considered to be within normal limits. Cells with a ‘non-glomerular’ appearance are likely to indicate a urothelial problem.

Where there is ‘significant haematuria’ (more than 20,000 RBC per ml in any test), initial urogenital imaging is to be by Ultrasound or Intravenous Pyelogram (IVP), as some 10% of all stones are radiolucent. The requirement for further investigation should be determined on clinical grounds and on the basis of investigation results.
Proteinuria

Orthostatic proteinuria can be excluded by testing an early morning urine specimen. If an early morning specimen remains positive for protein, then a 24-hour urine protein estimation is required. Normal is <150mg protein/day.

2.7.4 Urinary Calculi

There have been no reported episodes of incapacitation involving CASA certificate holders with a known history of renal calculi. However, there have been several untoward incidents as a result of undiagnosed or unreported stone. The aviation environment may predispose aircrew to stone formation due to the low humidity environment often found in aircraft cockpits, and because of a tendency for some pilots deliberately to under-hydrate to avoid the need to urinate, particularly where there is no toilet on the aircraft.

The presence of any stone or stones in the urinary system is aeromedically significant. (For CASA certification purposes, there is no such entity as an asymptomatic stone). Renal stones as small as 1-2 mm diameter can and do cause significant symptoms. There are no reliable prognostic indicators that can determine if a stone will or will not cause symptoms, and the chance of a stone present for 10 years moving in the subsequent 24 hours is the same as it moving after being present for 10 days. The time a stone has been present is not a reliable indicator of risk.

Single Renal Stone (Passed or Removed)

In applicants who have had a single episode of renal colic, about 50% will have a repeat episode within 5-7 years, and nearly 100% within 12-15 years, unless they modify their behaviour. However, for applicants who have passed all stones or had them removed and who are able to maintain adequate urine flow (>2 litres/day), the risk of stone recurrence is the same as for the general population. Thus CASA will certificate pilots and ATCs who have experienced a single episode of renal stone disease, with successful removal or passage of the stone. In such cases, the only surveillance need be by urine dipstick at routine CASA medical examinations.

Recurrent Renal Stones (Passed or Removed)

Pilots and ATCs who have experienced recurrent episodes of renal stone disease may be recertificated once they are proven to be free of all stones in the kidney or renal tract, have normal renal function and have adopted appropriate risk minimisation behaviour. CASA will require the following annual investigations and reports in these cases:

- Plain abdominal X-ray or ultrasound
- 24-hour urine calcium and urate estimations
- Urological review.
2. Medical Aspects
2.7 Nephrology and Urology

Retained Renal Stones

Where stone material remains in the renal substance or urinary tract, CASA will not permit unrestricted Class 1 or Class 3 certification unless there are clear mitigating factors that preclude renal colic, such as a staghorn calculus, a calculus in a diverticulum, or a stone clearly embedded in the renal substance. (Further stone movement is extremely unlikely in such cases.) Pilots or ATCs with staghorn calculi many be suitable for certification, on a case-by-case basis, until stone removal, provided they are asymptomatic, their renal function is normal, and movement of the calculus is considered unlikely. CASA may entertain unrestricted certification for Class 2 applicants in similar circumstances, on a case-by-case basis, and subject to annual urological review.

Approximately 20% of patients will have residual calculi three months after undergoing Extracorporeal Shockwave Lithotripsy (ESWL). Where there is a small stone or remnant following attempted removal with ESWL, generally accepted management is to leave the stone alone. However, due to the risk of inflight incapacitation with residual stone fragment movement, it may be worthwhile to offer removal of stone remnants via flexible ureteroscopy. There is currently an approximate 50% success with this procedure, but its risks include urine extravasation, which can be extremely painful. Percutaneous nephrolithotomy (PCNL) may be a better option for pilots to ensure a stone free status.

2.7.5 Medullary Sponge Kidney

Persons with medullary sponge kidneys (MSK) tend to be chronic renal stone formers. Therefore, most applicants for pilot or ATC certification who have MSK will not be issued an aviation medical certificate of any kind. However, CASA may certificate pilots or ATCs with this condition, on a case-by-case basis, if they have a history of one episode of renal colic or fewer, and if there are no residual stones demonstrated on investigation. (Beware of the applicant with only a radiological diagnosis of MSK and no history of stones or calcification. Many such persons have only a prominent medullary blush with no adverse implications for aeromedical certification.)
2.7.6 Glomerulonephritis

**Thin Membrane Disease**

Thin membrane disease (TMB) is due to a type IV collagen genetic defect and occurs predominantly in females. It has no major health implications and is considered benign for the purpose of CASA aeromedical certification. Patients with TMB often have an incidental finding of 80,000-100,000 RBC per ml of urine, but further investigation reveals no other abnormalities. If blood pressure is normal and renal function tests are normal (including 24-hour urinary protein excretion and 24-hour creatinine clearance), CASA will accept a presumptive diagnosis of TMB and will not require further investigation. While biopsy may be offered to confirm the diagnosis of TMB, such an investigation is not required for aeromedical certification.

Where TMB is confirmed by biopsy, there is no requirement for any surveillance. In the case of a presumptive diagnosis, the result of a serum creatinine study is required with every subsequent CASA medical examination.

**IgA Nephropathy**

This condition was formerly considered to be benign, but it is now clear that it may later lead to renal failure in some persons. Risk of disease progression is greater when it is associated with hypertension, abnormal renal function test results and renal scarring, detected on biopsy. In the absence of such abnormalities, the risk of renal failure in cases of IgA nephropathy is about 1% after 20 years. The condition is of aeromedical concern because of the risk associated with subtle incapacitation due to circulating toxins produced as renal failure progresses. Rapid progression to nephrotic syndrome may also occur. CASA will usually certificate pilots and ATCs who are affected by IgA nephropathy. Required surveillance measures are:

- 24-hour urine protein estimations
- Serum albumin testing
- Renal function testing.

All of these tests are to be done at six-monthly intervals.
2.7.7 Nephrotic Syndrome

Many persons affected by this condition recover spontaneously, while others respond well to treatment with steroids. If immunosuppression is necessary for treatment, pilots and ATCs may not exercise the privileges of their licences until treatment is complete. CASA will consider recertification once the condition has resolved, medication has been ceased and renal function has returned to an acceptable level (defined as protein excretion <3g per day).

2.7.8 Renal Failure

For aeromedical certification purposes, renal failure is defined by biochemical markers of impaired renal function. Physical symptoms of renal failure occur late in this disease and represent manifestations of severe end stage renal failure.

The main marker of renal function is the serum creatinine level. Most persons with chronic renal impairment who have a creatinine level <200 micromol/L suffer no untoward effects. (However, DAMEs should recall that a creatinine level <200 micromol/L may evoke severe symptoms in cases of acute renal impairment). Where an applicant’s creatinine level is between 200 and 500 micromol/L, the DAME’s clinical acumen will be required to determine fitness for exercise of licence privileges. A creatinine above 500 micromol/L invariably produces untoward health effects, including:

- Slowed mentation
- Poor concentration
- Lethargy
- Gastrointestinal disturbance
- Other electrolyte disturbances
- Rapid deterioration with intercurrent illness.
Aeromedical Disposition

When there are three test results of >500 micromol/L creatinine, the DAME should advise the applicant not to exercise the privileges of his/her licence and inform CASA of the details. Following a single initial test result of >500 micromol/L creatinine, the certificate holder should be advised not to exercise privileges, and a further test arranged for 48 hours later. If the second test confirms the original result, a third test is required 48 hours later again. The DAME should inform CASA Aviation Medicine Section of the results, and CASA will usually suspend the applicant’s medical certificate. For reported creatinine levels between 200-500 micromol/L, the DAME will consider the possible effect on safe aviation of symptoms such as those listed above, and either advise the applicant accordingly or discuss the matter with CASA Aviation Medicine Section.

Acute renal impairment is usually associated with a significant insult which itself precludes a medical certificate holder from flying or controlling. Once recovered from the precipitating cause of acute renal failure, CASA will consider recertification on a case-by-case basis.

Renal Dialysis

Persons undergoing renal dialysis usually have significantly high creatinine levels, even soon after completing a dialysis session. Their electrolyte levels may be abnormal because of large fluid shifts that accompany dialysis. Consequently, persons undergoing renal dialysis may remain symptomatic for several hours following dialysis. CASA will not usually certificate pilots or ATCs with chronic renal failure who are undergoing dialysis (of any type). Very well controlled pilots and ATCs may be granted special certification, on a case-by-case basis, permitting exercise of privileges in the period between 12 and 36 hours (only) following a dialysis.

Renal Transplant

Following renal transplantation, most recipients receive immunosuppressants to prevent tissue rejection. They have increased risks of hypertension and of ischaemic heart disease, also of developing carcinoma. Some transplant recipients have minimal complications and normal renal function. CASA will not consider aeromedical certification for pilots or ATCs until 12 months following transplantation. If the applicant is then receiving standard immunosuppressant therapy, has well controlled blood pressure, and renal function is at an acceptable level, CASA, may consider recertification, on a case-by-case basis.
2.7.9 Single Kidney

If an applicant has a single kidney and this condition is developmental, renal function testing should be undertaken. If this is normal, aeromedical certification will be unaffected. If an applicant has a single kidney due to nephrectomy, the cause of the kidney’s removal must also be considered. If the underlying cause does not affect certification, then the same considerations of renal function testing and aeromedical disposition apply as for developmental variations.

2.7.10 Urinary Tract Infections

Female

In the young adult female, isolated urinary tract infection (UTI) is common. Investigation rarely reveals a specific cause. A small percentage of women will develop chronic or recurrent UTIs. They require investigation (including IVP) to exclude underlying anatomical causes. Some of them may need antibiotic cover for extended periods and/or post coital antibiotic prophylaxis. Female applicants receiving antibiotic treatment for recurrent UTIs are unlikely to adversely affect the safety of air navigation, and there need be no restrictions on their aeromedical certification.

Male

A UTI in a male usually indicates the presence of an anatomical abnormality in the urinary tract. The diagnostic yield from investigations is about 50%. Adequate investigation must include IVP and cystoscopy. Future aeromedical certification will depend on the findings from investigations.

2.7.11 Prostatitis

Acute bacterial prostatitis should be managed as an acute intercurrent illness (like UTI) and the pilot or ATC returned to duty only when fully recovered. Non-bacterial or chronic prostatitis is considered to be a form of pelvic pain syndrome, often accompanied by significant psychological overlay, analogous to the findings in Irritable Bowel Syndrome. Chronic prostatitis is often distracting and may be difficult to manage. Best pharmacological management is with anti-inflammatory and/or anti-depressant medications. CASA will determine future aeromedical certification of affected applicants on a case-by-case basis. The DAME should closely assess the psychological status of any affected pilot or ATC before making a recommendation concerning aeromedical disposition.
2.7.12 Urinary Outflow Obstruction

Benign prostatic hypertrophy (BPH) is the commonest cause of outflow obstruction in Australian males. Acute urine retention occurs in persons affected by BPH at the rate of 5-8% per annum. There is also a small risk of chronic incapacitation due to reduced renal function.

An acute retention episode may be treated by surgery, or by use of an alpha-blocker medication. Successful surgery will usually result in clearance to return to flying or controlling as soon as the applicant has fully recovered from the effects of the surgery. Note that alpha blockers may reduce G-tolerance—the more specific the drug, the better tolerated. Tamsulosin or alfalfusin are highly selective, but are seldom prescribed in Australia as they are not currently listed on the PBS. Prazosin is listed on the PBS, but is less selective than other available agents and has more side effects. Prazosin use is not compatible with agricultural or aerobatic flying, and medical certification for pilot applicants using it will contain appropriate restrictions.

2.7.13 Testicular Cancers

Also see Section 2.14, Malignancy.

Teratoma

The progress or recurrence of teratomas may be determined by use of an appropriate marker. Chemotherapy is the usual treatment and there is >90% cure rate. When the applicant has a stage A tumour and markers are normal, early return to duty may be possible. For stage B tumours, where adequate treatment requires 3-4 cycles of chemotherapy, return to duty will be delayed until at least three months after completion of chemotherapy. All such cases should be referred to CASA Aviation Medicine Section for determination of aeromedical disposition.

Seminoma

Seminomas are very sensitive to radiation, and a very low radiation dose may be curative. As there is no reliable marker available at present, surveillance can be difficult. Once treatment is complete, early return to duty may be possible. All such cases should be referred to CASA Aviation Medicine Section for determination of aeromedical disposition.
2.7.14 Prostatic Carcinoma

Prostate Specific Antigen (PSA) is a very reliable marker for progress of established prostatic cancer. However, it is unreliable as a screening test and there is still no normal range defined for it. Risk of prostate cancer against PSA may be graphed, and most laboratories recommend further investigation when a PSA is >4, but positive predictive value is poor at this level. Once PSA reaches 12, the PPV is close to 1.

In established disease, the PSA is a proxy measure of prostate bulk and of cell turnover. PSA levels >50 are associated with a significant risk of pathological fractures, cerebral and other metastases. However, applicants with prostate cancer and a PSA of <30 have a positive bone scan in <1% of cases. An applicant with PSA of <20 will have cancer mass of only a few grams, while a PSA <12 is not associated with significant risk of metastases.

**Aeromedical Certification**

Post-radical prostatectomy, if the operation has been successful, PSA should fall to undetectable level. If the level remains undetectable at three years post surgery, there is <5% chance of recurrence of disease. In such circumstances, applicants can be considered cured after four years. Radiotherapy now produces similar outcomes and if PSA remains at nadir levels for 3-4 years following radiotherapy, a similar assessment may be made. Usually, certification for all classes of medical certificate may be possible 3-4 months post surgery or after completion of radiotherapy. CASA will require annual follow up urological reports and PSA estimations. However, if the PSA remains undetectable five years after surgery, no further reports will be required.

Pilots and ATCs with advanced prostatic cancer and PSA >30 must also undergo bone scan as part of their required investigations. CASA will usually only contemplate certification for this group on the basis of ‘as-or-with co-pilot’ or ‘as-or-with second controller only’.

Treatment with anti-androgen therapy produces significant side effects in about 10-20% of cases, particularly lethargy. LHRH agonists may rarely cause a chronic confusional state. Prior to return to duties, an applicant receiving anti-androgen therapy will require an operational check. (Also see Section 2.13, Medication – Drugs and Flying / Controlling.)
2.7.15 Renal Cell Carcinoma

Cerebral spread from a renal cell carcinoma is highly likely. Previously, this cancer has usually been detected late, and affected persons have had poor survival rates. However, recently these tumours have often been detected incidentally by ultrasound. 80% of these tumours are now <5cm in diameter when found, and five-year survival in those affected persons is >90% following treatment. Even for larger tumours (<10cm), five-year survival is >70% following treatment.

Aeromedical certification

As the outcome of renal cancer is unpredictable, and as cerebral metastases are common, CASA will determine aeromedical disposition of pilots and ATCs with this condition on a case-by-case basis. If granted, initial certification is likely to be ‘as-or-with co-pilot’ or ‘as-or-with second controller only’. Certification will not be granted until at least six months following completion of treatment. Unrestricted class 1 certification will not be considered until at least three years post treatment. Class 2 applicants will be considered for unrestricted certification after two years, and Class 3 applicants after one year. CASA requires follow up investigations as follows:

- Six-monthly CT scans for Class 1 applicants
- Annual CT scans for class 2 and 3 applicants.

In all cases, additional investigations must include Full Blood Examination (to exclude polycythaemia), Liver Function Tests, and Urea and Electrolyte estimations.

After 10 years without recurrence of tumour following treatment, an applicant may be deemed ‘cured’. Thereafter, no additional surveillance measures will be required.
2.7.16 Polycystic Kidneys

Polycystic kidneys (PCK) may be associated with several complications that could adversely affect the safety of air navigation. These include acute pyelonephritis, haemorrhage into cysts, renal stones, berry aneurysms and cardiac valvular disease. However, most persons with polycystic kidneys do not experience these complications. The commonest side effect of the condition is hypertension, usually readily controlled by medication. Due to the statistical association of polycystic kidneys with berry aneurysm, all applicants with known PCK must provide the result of a recent Magnetic Resonance Angiogram (performed within 12 months). If this is normal, CASA will usually approve medical certification. However, the test must be repeated and results provided to CASA at intervals of five years while medical certification is maintained. If the DAME detects any cardiac murmur when examining an applicant with PCK, CASA requires an echocardiogram and report for initial certification. This is also the case when any new murmur is noted.

2.7.17 Amyloid

This is a systemic disease with possible renal, neuropathic and cardiological manifestations. On diagnosis of the condition, inform CASA Aviation Medicine Section and advise the applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA. Following appropriate investigations, CASA will determine aeromedical disposition on a case-by-case basis.
2.8.1 Gynaecological and Obstetric Standard – CASR Part 67

The gynaecological and obstetric standards are found in the following paragraphs of CASR Part 67:

- CASR 67.150(7) Table 67.150
  1.23 – 1.24
- CASR 67.155(7) Table 67.155
  2.22 – 2.23
- CASR 67.160(7) Table 67.160
  3.21 – 3.22

2.8.2 Severe Menstrual Disturbances

Applicants with a history of severe menstrual disturbances resistant to treatment must be assessed with caution. Such applicants are likely to be unacceptable for issue of a Class 1 or Class 3 Medical Certificate.

2.8.3 Pregnancy

Pregnancy, particularly during the final trimester, is a cause of temporary unfitness to exercise the privileges of all aviation licences. However, where the obstetrician or other medical practitioner supervising the pregnancy certifies that an applicant or medical certificate holder has no significant medical contraindications related to the pregnancy, she may be assessed as meeting the appropriate medical standard(s). The exercise of licence privileges in such circumstances may involve imposition of appropriate, individually determined operational restrictions.

The risk of acute incapacitation from premature labour exceeds 1% after 30 weeks gestation. Consequently, all medical certificate holders are advised not to exercise licence privileges after 30 weeks gestation.

Class 1 and 2 medical certificate holders are formally deemed medically unfit to exercise licence privileges from 30 weeks gestation until cleared by a post-partum assessment conducted in accordance with the last paragraph in this section.
Class 3 medical certificate holders may exercise relevant licence privileges until 34 weeks gestation provided that:

i. The obstetrician or other medical practitioner supervising the pregnancy certifies that the licence holder is fit for duties during this period; and

ii. Suitable administrative arrangements are made which ensure that sudden incapacitation of an affected licence holder due to premature labour will not adversely affect the safety of air navigation.

Thereafter, Class 3 medical certificate holders also are formally deemed medically unfit to exercise licence privileges until cleared by a post-partum assessment conducted in accordance with the following paragraph.

Following delivery, applicants are required to obtain a clearance from a DAME before once again exercising the privileges of an aviation licence. Depending on the stage of a pregnancy at which the event occurs, such clearance may also be required following a miscarriage, stillbirth or termination of pregnancy. Pregnancy is considered a medically significant condition and DAMEs should remind pregnant applicants of their obligations under CASRs to refrain from exercising their licence privileges until medically cleared. (See also 1.4.5 Temporary Incapacity of Certificate Holders.) Following a normal delivery, clearance to resume flying duties should be appropriate at six weeks post-partum.
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2. Medical Aspects
2.9 Gastroenterology

2.9.1 Introduction

There is a very wide range of conditions of the gastrointestinal tract and associated organs that may have aviation safety implications. The greater majority are compatible with certification after appropriate assessment and management. This section provides guidance on common conditions of the gastrointestinal tract, liver and pancreas that may be presented to a DAME. It does not cover GI malignancy. All malignancy related advice is addressed in the Section 2.14 Malignancy of this handbook.

2.9.2 Alimentary System Standard – CASR Part 67

CASR 67 The alimentary system standards are found in the following paragraphs of CASR Part 67:

- CASR 67.150 For medical standard 1 CASR 67.150(7), Table 67.150 1.14
- CASR 67.155 For medical standard 2 CASR 67.155(7), Table 67.155 2.13
- CASR 67.160 For medical standard 3 CASR 67.160(7), Table 67.160 3.13

2.9.3 Gastro-Oesophageal Reflux Disease (GORD)

GORD is a very common condition. GORD and Irritable Bowel Syndrome are the two most common GI diagnoses in the Australian pilot population. Underlying pathology that is severe or progressive is unlikely. However, the possibility of cardiological cause of the symptoms should always be borne in mind, particularly where there is resistance to treatment. Where there is chest pain with uncertain aetiology, it is imperative to exclude a cardiac cause before moving to GI or other systems.

Around 50% of all patients diagnosed with GORD have no findings on endoscopy. This is often described as nervous or non-ulcer dyspepsia (NUD) but in reality this is endoscopy negative symptomatic gastro-oesophageal reflux that might be revealed by other techniques, such as oesophageal pH monitoring. NUD refers to symptoms that occur in a group of people without endoscopic or physiological evidence of an acid-peptic complaint. These people usually have a limited or zero response to acid suppressing medication.
Treatment can commence based on symptoms and endoscopy conducted, when response to treatment is poor, “alarm” symptoms occur (eg bleeding, dysphagia) or long term treatment appears to be indicated. Medication is generally very successful, especially with the development of Acid/Proton Pump Inhibitors (PPIs). These drugs have a low side effect profile. Bleeding from reflux oesophagitis while on PPIs is very rare. In theory, intense gastric acid suppression by PPIs may increase susceptibility to gastrointestinal infection, as the internal environment of the stomach is less hostile to ingested organisms. Those who have been treated and are symptom free are generally suitable for certification. Where there are persisting symptoms, treatment should continue, with regular reviews. High-risk ‘alarm’ symptoms such as dysphagia indicate endoscopy. After short term treatment symptoms may return, sometimes with a rebound effect after stopping a PPI. Ongoing treatment may be indicated. However, ‘on demand' treatment is becoming more popular. This should not present difficulties with aviation duties.

Selective Serotonin Reuptake Inhibitors (SSRIs) are fairly commonly prescribed along with PPIs for non-ulcer dyspepsia. This is not a risk in itself, but caution is required with the use of SSRIs. Refer to the Section 2.6 Psychiatry in this handbook. Cisapride and SSRIs have a risk of cardiac arrhythmia. Treatment with cisapride is mostly limited to treatment of gastroparesis and therefore cisapride is likely to be withdrawn from the Australian market.

Other medications that may be used include H₂ receptor antagonists. There is some sedation associated with these medications, and a ground trial period is advised. Metaclopramide may on occasions alter the level of consciousness and should not be used for ongoing treatment.

**Barrett’s Oesophagus**

- **Long Segment**: Second-yearly endoscopy will generally be required.
- **Short Segment**: Five-yearly endoscopy will generally be required but current approaches vary.

### 2.9.4 Peptic Ulcer Disease

Management of peptic ulcer disease (PUD) has changed comprehensively following the identification of helicobacter pylori as the most common cause of ulcers. The vast majority of peptic ulcer disease is now known to be due to helicobacter or NSAIDs. Smoking is a further independent risk factor. PUD may be ‘silent’ and not cause symptoms but the risk of a sudden acute bleed in an asymptomatic person is small. “Silent” ulcers are more common and more likely to cause morbidity in those taking NSAIDs including COX-2 inhibitors.
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**Duodenal PUD**

**Symptomatic PUD with helicobacter pylori.** With the onset of symptoms, the DAME should impose a period of no flying or controlling. In this case, there is a requirement to undertake clearance of the infection prior to return to flying. A negative urea breath test is usually taken to be definitive proof of clearance when performed around two months after treatment. Where the DAME is satisfied that that symptoms have resolved and there will be compliance with the rest of the treatment, there may be a return to flying or controlling. Such return must be on the understanding that evidence of clearance of infection is required within three months of completing treatment. Definitive proof of clearance is usually currently obtained by a urea breath test around two months after treatment. A period of at least seven days off PPIs is necessary prior to the test. Should the infection still be present, the risk of recurrence of symptoms is high (around 80% in the first year). Failed eradication usually indicates the need for further treatment. Without eradication after the follow up test, further treatment is required. Where this second attempt at clearance is unsuccessful, the pilot or controller will usually be grounded until eradication is proven. Where there is symptomatic duodenal PUD only without complication, there is no requirement for a second endoscopy to prove ulcer healing. Once eradication has occurred, the lifetime risk of recurrence is only around 3 to 5%.

**Symptomatic PUD without helicobacter pylori.** The cause of the PUD needs to be identified and corrected. This is most commonly NSAIDs. The usual treatment for the ulcer in this case is a PPI for around six to eight weeks.

**Complicated duodenal PUD.** Where there are complications of PUD such as bleeding or perforation the pilot should be grounded during treatment. Endoscopic proof of ulcer healing will usually be required prior to clearance to return to flying or controlling. Approximately 80% of all ulcers are healed after one month. Therefore, the second endoscopy is best scheduled for around this time. Furthermore, when helicobacter infection has been detected and treated, proof of clearance will be required either by a urea breath test or endoscopic gastric biopsies for rapid urea testing (eg CLO/HUT tests) or histology.

**Chronic duodenal ulcer without eradication of Helicobacter pylori.** Consideration will be given to certification of pilots or controllers who have not eradicated Helicobacter pylori, either due to not undertaking eradication or failure of the eradication. Applicants must be on long-term maintenance therapy with a proton pump inhibitor and without symptoms.

**Gastric Ulcer**

Gastric ulcers should be treated in a similar way to complicated duodenal ulcers. A second endoscopy, usually at one month after beginning treatment, is required to demonstrate healing of the ulcer prior to consideration of return to flying. The underlying cause of the ulceration needs to be identified and corrected wherever possible.
2.9.5 Hepatitis

**Acute**

Acute hepatitis may be due to a number of causes, predominantly infectious but may also be toxic or immunological. The individual is usually too sick to function adequately and is not physically able to fly. The enterically mediated causes, mainly Hepatitis A and E, and other causes such as CMV and EBV generally result in a full recovery. Initial work up should include routine blood tests, LFTs, FBE, infectious hepatitis serology, and an upper abdominal ultrasound. Return to flying is based on evidence of clinical recovery. Some episodes of hepatitis are followed by a prolonged phase when the patient remains jaundiced but otherwise recovers. No further investigation is recommended until six months after presentation, unless the episode is fulminant. In this case, patients may progress from walking to moribund in 24 to 48 hours, but thankfully this extremely fulminant presentation is rare.

**Chronic**

The main causes of chronic hepatitis of aeromedical concern are Hepatitis B and Hepatitis C. These may be slowly progressive and may lead to cirrhosis and hepatic decompensation. There is unlikely to be an acute presentation, unless unexpected decompensation occurs secondary to portal hypertension causing haematemesis or ascites with infection.

Transmission of infection is not an issue in civilian aviation. The presence of Hepatitis D in particular should raise the prospect of intravenous drug use.

**Treatment for Hepatitis C.** Current treatment protocol for progressive Hepatitis C infection is combined Interferon and Ribavirin. Both of these medications have significant aeromedical issues, with interferon occasionally causing neuropsychiatric symptoms, which may occur intermittently and unpredictably throughout treatment. Most people also experience significant malaise. Ribavirin produces a significant anaemia in many patients. Thus, there should be no flying or controlling during the course of treatment. There may be consideration of return to duties once off medication and any anaemia has resolved.

**Progressive hepatitis** There is no one measure of the progression of chronic hepatitis and cirrhosis. Bilirubin, albumin and prothrombin time/INR are the best independent laboratory measures. These should be considered together with the presence of ascites and encephalopathy. Each case needs to be individually assessed, particularly for the presence of portal hypertension and hepatic encephalopathy, including minimal (stage 1) hepatic encephalopathy (MHE). While there is no overt deterioration in cognitive or affective functioning, there will not be a restriction on flying, but increased surveillance will be necessary.

Abnormal LFTs that have been noted for greater than 12 months indicates the potential for chronic liver disease and cirrhosis.
Liver biopsy. A liver biopsy provides very useful diagnostic and prognostic information but can cause serious complications such as intra-abdominal haemorrhage. The decision to recommend biopsy will usually be delayed for at least six months after presentation depending on the degree to which liver enzymes and function are abnormal. Many patients with abnormal liver enzymes, even over a long period, will not have an absolute indication for liver biopsy. The timing of liver biopsy, if necessary, can be based on clinical progression and the level of concern expressed by the patient regarding diagnosis and prognosis.

2.9.6 Abnormal Liver Function Tests

Liver function tests are frequently found to be abnormal, with small elevations in one or two liver enzyme parameters. Given that the normal range by definition comprises two standard deviations from the mean, some 5% of all truly normal results will be classified as being abnormal—that is, falsely abnormal results. Where there is a real abnormality, the most common causes are Gilbert’s Syndrome (slightly raised unconjugated bilirubin, most common manifestation), non-alcoholic fatty liver disease (NAFLD), and minor alcohol effects.

In the absence of other clinical clues, slightly abnormal LFTs are best repeated after around one month. If they remain elevated, then the following is recommended:

1. Assessment of alcohol intake.
2. Family history of liver disease.
3. Blood Tests: Hepatitis B & C; Iron studies including ferritin; Copper studies; α1 antitrypsin; hepatic autoantibodies.
4. Upper abdominal ultrasound.

Definitive diagnosis of a fatty liver can only be achieved by liver biopsy, but it is usually diagnosed based on clinical picture only. Alcoholic disease and diabetes mellitus should be included in the differential diagnosis. Ultrasound is moderately reliable for fatty liver, with increased echogenicity/altered hepatic texture most likely to be due to fat. However, fibrosis or cirrhosis could also be present and difficult to detect.

There should be regular reviews of aircrew with continuing abnormal LFTs. Where transaminase is <100, repeat testing should be every six to 12 months. If the transaminase is above 100, testing should be every three to six months.
2.9.7 Alcoholic Liver Disease

This section will not discuss alcohol related illness. Rather, there will be a discussion of the effects of alcohol on the GI system.

There are no definitive tests that can demonstrate clearly that alcohol is the cause of liver disease. In the end it comes down to honest reporting. Blood tests can help; MCV, γGT and AST>ALT are suggestive. Liver biopsy is not definitive as many other causes can produce similar findings. Carbohydrate deficient transferrin is becoming used, but it remains largely a research tool. It can be useful as a confirmation, and to monitor progress within that individual.

Relapsing hepatic decompensation, gastritis, neurological signs, including cerebellar signs are all useful as part of a broader picture in advanced cases of alcoholic liver disease when cognitive and physical incapacity are present. DUI convictions may also be indicative.

Screening tests have not been found to be particularly valuable. The AUDIT is probably the most widely used. The tests are aimed at the severe end of the alcoholic spectrum. In practice, concern should be raised where the drinking exceeds the NH&MRC recommended limits of four standards drinks per day for men and two standard drinks per day for women.

Approximately 1:5 people who drink excessively will have liver abnormalities. It is the most reversible form of liver disease in the early stages. Stopping drinking will usually reverse abnormalities within around six months. The alcoholism is more important than the alcoholic liver disease, and the focus should be put on the alcoholism. Until there is a secondary effect from liver damage, there should be no impact on flying from the liver disease. The impact on flying will be from the alcoholism.

2.9.8 Gallstones And Gall Bladder Diseases

Asymptomatic gallstones (chance finding). It appears that the risk of cholecystitis in the presence of asymptomatic gallstones, where there has never been symptoms, is low, and almost certainly is below 1% per annum, although there is little data to work from. Gallstones ranging from a single large stone to multiple small stones may be detected by ultrasound. There is a slightly increased risk of biliary colic, pancreatitis and other hepatobiliary symptoms with small gallstones but the outcome of expectant versus prophylactic cholecystectomy is no different. There will generally be no change to flying status unless gallstones become symptomatic. In those who are asymptomatic there is no requirement to remove the gall bladder for fitness to fly.

Acute cholecystitis. Generally the pilot will be too sick to fly.
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**Following single episode of cholecystitis.** Often after a single episode, patients are treated expectantly and wait to see if another episode occurs. However, the risk of a further episode is around 5% per annum. Therefore, it would be expected that there is no return to flying until the gall bladder is removed. There may be the option of multi-crew certification for Class 1 or 2, or no solo controlling for Class 3 pending definitive resolution.

**Stones in bile duct.** The presence of stones in the bile duct is not compatible with flying or controlling. There is a significant risk of ascending cholangitis or pancreatitis, and the stones must thus be removed prior to returning to any duties.

### 2.9.9 Haemochromatosis

Haemochromatosis is a genetic disease that is often found incidentally, mainly through liver function testing or iron studies. The presence of the relevant genes in the Australian population is around 1:200. Around 50% of these will develop significant iron loading but not all genetically affected individuals develop liver or other organ injury (ie, phenotypic variation in disease expression). Organ injury depends on the severity of iron loading and co-factors such as significant alcohol consumption or other co-existent causes of liver injury. Should iron loading be prevented (usually by early detection and venesection treatment) then permanent liver injury (fibrosis/cirrhosis) usually does not occur. The best measure of iron stores in this context is serum ferritin.

Screening is possible, but to date has not been recommended in the Australian population. This may be by transferrin saturation, or by HFE genetic testing. There is no requirement to screen for haemochromatosis in the aviation context unless there is a family history of the disease.

Late diagnosis can be a problem, with progression to cirrhosis, pancreatic injury (diabetes mellitus), heart (arrhythmias, heart failure) and pituitary involvement. Males usually present in the 5th decade, females in the 6th decade due to their generally lower rate of iron load. If, at age 40 years the ferritin level is less than 1000 ugm/l and LFTs are normal, the risk of permanent liver damage is negligible. Cardiac assessment should include the presence of conduction defects and cardiomyopathy.

Treatment is via regular phlebotomies/venesection. Pilots and controllers should not exercise the privileges of their certificates for 24 hours after each venesection due to possible cardiovascular instability.
2.9.10 Pancreatitis

Pancreatitis is sometimes diagnosed in the setting of a small increase in serum lipase. However, for the diagnosis to be made there should be a significant increase in lipase together with acute abdominal pain.

The main risk factors are

- **Gall stones.** If gallstones are found, where there are no other risk factors, the gall bladder should be removed.
- **Alcohol.** This usually produces a relapsing picture.
- **Hypercalcaemia.**
- **Hyperlipidaemia.**

Where there is no obvious cause, there may be abnormalities in anatomy. Assessment is usually by MRCP first, followed by ERCP.

Risk of recurrent attacks is highly individual. Idiopathic pancreatitis may be expected to have one to two attacks per year.

**Single episode.** Following a single episode, where there are no ongoing symptoms and any predisposing factors have been addressed, the individual will usually be able to return to flying.

**Recurring pancreatitis.** While symptomatic the individual is very unwell, usually requiring narcotic analgesia. Recurrent pancreatitis is generally not compatible with continued flying or controlling.

**Chronic pancreatitis.** Generally the individual is too sick or has too much ongoing abdominal pain to contemplate flying. A CT scan can be performed to look for the presence of a pseudocyst or abscess. It is unlikely that anyone suffering from chronic pancreatitis will be fit for flying or controlling duties.

There is an association with the development of diabetes; a fasting blood sugar should be obtained as part of the workup.
2.9.11 Coeliac Disease

Coeliac disease can produce severe symptoms of bloating, diarrhoea, abdominal pain and anaemia, but mostly symptoms are mild and presentation is now usually in mid-life. Treatment with a gluten-free diet is usually effective, and should not be an aviation safety issue. People non-compliant with dietary modifications will continue to be symptomatic and some patients will exhibit refractory disease; these cases should be considered on their merits.

Coeliac disease should be thought of as a potential marker for other immunologically mediated diseases, such as type 1 diabetes mellitus and thyroid disease.

2.9.12 Irritable Bowel Syndrome

Irritable bowel syndrome is a very common diagnosis in the Australian pilot population. Some 20% of adult females and 10% of adult males have some symptoms consistent with this diagnosis. Most common symptoms are of abdominal pain, bloating, diarrhoea and constipation. It is unusual to get acute, severe symptoms.

There is a high co-morbidity with obsessive and depressive illness and SSRIs are often used.

Most people can be managed without drugs, using diet.

Diarrhoeal symptoms may be treated with loperamide. This drug does not usually have any central nervous system side effects. Diphenoxylate should not be the first drug of choice for aircrew or controllers, due to its potential neuropsychological effects. If it is necessary, this should be discussed with Aviation Medicine Section doctors.

Colicky abdominal pain and more general abdominal discomfort can be treated with anticholinergics such as donnatabs or mebeverine. Bloating will tend to persist despite treatment. Caution is required regarding anticholinergic side effects, particularly to vision.

Constipation can be treated with high fibre and simple laxatives, with osmotic laxatives such as magnesium sulphate or lactulose preferred in the longer term.

For refractory symptoms, tricyclic antidepressants are the most effective. Tricyclic antidepressants have significant potential aeromedically adverse effects. Refer to Section 2.6 Psychiatry for further guidance.

Most applicants will be fit to hold a certificate. Surveillance may be required annually in the more severe cases.
2.9.13 Inflammatory Bowel Disease

It is often assumed that Ulcerative Colitis and Crohn’s disease are versions of the same disease or are even interchangeable. However, they do have differing natural histories, with Crohn’s disease tending to be worse, with relapse being the rule.

It should be assumed from the outset that Inflammatory Bowel Disease (IBD) will impinge on certification. However, most sufferers are able to obtain certification with regular surveillance.

High-dose systemic steroids should not be used while flying due to the risk of neuropsychological side effects.

If the disease is unstable the person should be grounded, due to diarrhoea, pain and poor nutrition. Stabilisation is usually over several months during treatment with aminosalicylate drugs (eg, sulphasalazine, mesalazine, olsalazine) and either systemic or rectal corticosteroid treatment. Immunosuppressant medication (such as azathioprine or 6-mercaptopurine) is used to prevent disease relapse in more severe cases. There is a higher risk of skin cancer on azathioprine. Methotrexate can damage the liver.

Flare-ups tend to occur in a subacute manner, with warning often over several days. Acute incapacitation is unlikely, unless there is a clear pattern of such already established. Fitness to fly during flare-ups should be handled as a transient event with clearance to return to flight duties according to CASR 67.265.

Ulcerative Colitis

Ulcerative Colitis may be severe, but is often a relatively mild disease. This is especially so of treated ulcerative colitis of the rectum and sigmoid. The disease may ‘burn out’ in the 50s. With proctitis alone, risk of cancer is no different to the general population.

Crohn’s Disease

Almost all Crohn’s sufferers receive surgery at some stage. Systemic symptoms are more common with febrile disease and acute abdomen amongst the more common manifestations.

For mild disease, Full Blood Examination, C-reactive Protein, Liver function tests and rectosigmoid examination should be carried out annually. LFT should be more often if taking methotrexate.

When there has been pancolitis, regular annual or biennial colonoscopy will improve early detection of colorectal neoplasia beginning eight to ten years after initial diagnosis of colitis.
2.9.14 Chronic Diarrhoea

There are many potential causes of chronic diarrhoea. Most commonly there is irritable bowel syndrome. However, it is important to rule out an infective cause. Medications may also be a cause, such as weight loss treatments including xenical.

In general, diagnosis should be by exclusion of treatable GI disorders, and then treated as for IBS.

2.9.15 Diverticulitis

Diverticulosis of itself is not an issue for aviation safety. A single episode of diverticulitis is generally not of significant concern. Where there is chronic symptoms or recurrence, it is important to evaluate for risk of further symptoms. Partial colonic resection may be required. Each case will be considered on its merits.

2.9.16 Colonic Polypectomy

Following polypectomy by colonoscopy, there is an approximate risk of 1:300 to 1:500 that a significant colonic bleed from the polypectomy site will occur in the first two weeks. The risk is higher if anti-platelet drugs or anti-coagulants are taken after colonoscopy. During this time, therefore, it is best not to fly, due to the risk to safety and lack of access to care. However, it may be reasonable to consider flying operations other than single pilot operations or no solitary controlling.

2.9.17 Bowel Obstruction

Bowel obstruction will result in severe pain and vomiting. A history of bowel obstruction indicates a high risk of recurrence. A single band or hernia can be repaired and certification is usual after recovery. However, recurrent obstruction is of grave concern for certification. Generally, the more episodes of obstruction, the greater the risk of subsequent episodes. Certification will be on a case-by-case basis, with a surgical opinion as to the cause and likelihood of recurrence.
2.9.18 Stomas

In this section the underlying illness or event leading to creation of an “-ostomy” is not addressed. Stoma bags are generally vented and filtered to avoid any risk of trapping of gas or odours becoming an issue.

**Colostomy**

Generally, patients with a colostomy manage well. Most are due to surgery for colon cancer, and the oncology issues are more important. See section 2.14 *Malignancy* of this handbook. A total colectomy for functional problems often results in small bowel functional problems.

**Ileostomy**

The major issue with ileostomy is dehydration. Electrolyte disorders are fairly common, with hyponatraemia and bicarbonate loss. Fluid that is usually reabsorbed will be lost through the stoma, and an additional litre of fluid may be required.

The great majority of applicants with a stoma will not be restricted on the basis of the stoma.

2.9.19 Haemorrhoids

Haemorrhoids will occur with a relatively high frequency in the pilot population, due to poor low fibre diet, inadequate seating and dehydration. It is rarely a cause of acute incapacitation.

Rectal bleeding should be investigated to exclude other causes, especially carcinoma, even in the presence of haemorrhoids. Only with the exclusion of other causes should the haemorrhoids be regarded as the cause.

An acute clot in an external haemorrhoid often causes marked discomfort, but should not be sufficient to cause incapacitation.

The presence of haemorrhoids should not in general hold up certification.

2.9.20 Anal Fissure

As for haemorrhoids, the presence of bleeding should result in investigation to exclude other more serious causes. The fissure may be distracting but not to the extent of incapacitation.
2.9.21 Abdominal Hernias

Abdominal hernias are of concern due to the risk of acute intestinal obstruction. Where the hernia is amenable to repair and there is a risk of obstruction, it should be treated. If no treatment is planned, a justification based on likelihood of becoming symptomatic should accompany any application. While waiting for repair, the need to restrict the applicant will depend on clinical circumstances. Where there is a bowel loop in a hernia, restriction is likely.

Hiatus hernias only infrequently require repair. A rolling hiatus hernia is at greater risk of obstruction. Generally symptoms can be managed through the use of proton pump inhibitors or H$_2$ antagonists.

2.9.22 GI Bleeding of Unknown Cause

Where there is an iron deficiency anaemia that has been investigated, and endoscopy and colonoscopy are reported as normal, the source of bleeding is likely to be from the small bowel. Often iron deficiency occurs in those who have had long-term aspirin or NSAID treatment. At present, in the absence of ‘red flags’ (eg, systemic symptoms such as unexplained weight loss, fevers, night sweats, persistent significant change in bowel habit, abdominal pain or symptoms of overt GI bleeding such as malaena) to suggest a serious cause, the patient will not be further investigated, and iron supplements used. If supplements are successful, then a cause will probably never be found.

Where iron supplements are used and anaemia progresses, further investigation is required; this may be enteroscopy using a similar procedure to endoscopy, ‘capsule endoscopy’ and/or CT scan. A thorough work up is mandatory to exclude significant disease.

It should not be necessary to ground pilots except those whose anaemia progresses and haemoglobin drops below 10.

If the Hb recovers, then surveillance should be of regular Hb levels, at least every two months for 6-monthly and subsequent testing depending on progress. Restoration of body iron stores (as documented by a progressively normalising serum ferritin taken during a period when iron supplements have been stopped for at least one week) by treatment with oral iron supplements usually takes three to six months minimum, usually with the Hb having returned to normal at an earlier time.

A presentation of malaena is a very different proposition. A cause will need to be identified as there is a high risk of recurrence and of severe causes. The individual should not fly until the cause has been identified and risk of recurrence quantified.
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2.10.1 Introduction

Applicants with haematological conditions are considered individually depending on the nature of the condition, its cause (if known) and natural history. The overriding concern is that the blood must carry sufficient oxygen to satisfy metabolic requirements during all phases of flight.

2.10.2 Reticulo-endothelial System Standard – CASR Part 067

CASR 67 The Reticulo-endothelial System standards are found in the following paragraphs of CASR Part 67:

- CASR 67.150 For medical standard 1 CASR 67.150(7)
  Table 67.150
  1.17 – 1.18
- CASR 67.155 For medical standard 2 CASR 67.155(7)
  Table 67.155
  2.16 – 2.17
- CASR 67.160 For medical standard 3 CASR 67.160(7)
  Table 67.160
  3.16

2.10.3 Anaemia

Applicants whose haemoglobin is less than 100 g/l should be investigated as clinically indicated. Final assessment depends on the results of haematological investigations and response to treatment. Full reports are required.

2.10.4 Polycythaemia

Applicants with higher than normal haemoglobin must be appropriately investigated. In secondary polycythaemia due to lung disease, the lung disease is more important. Applicants with polycythaemia vera, untreated or uncontrolled, will be assessed as failing to meet the standard, but will be reconsidered depending on their response to treatment, and on specialists’ reports.
2.10.5 Acute Leukaemia

Acute leukaemia of any type is disqualifying. Applicants assessed as in remission may be permitted to exercise the privileges of the licence held, depending on specialists’ reports. Full details are required.

2.10.6 Chronic Leukaemia

Chronic leukaemias are assessed individually. A specialist’s report is required in every case, including a statement on prognosis for the next year (re-certification is year by year, if at all). Some chronic leukaemias, e.g. CGL, CLL and other myeloproliferative diseases, are usually associated with an enlarged spleen. There is a consequent risk of splenic infarction and rupture (spontaneous or traumatic) in these applicants.

2.10.7 Lymphomas

Applicants with lymphoma are assessed individually. A lymphoma in remission, especially Hodgkin's Disease, is usually consistent with a pass assessment for applicants concerned. Annual specialist reports are required in all cases.

2.10.8 Haemoglobinopathy

Applicants with abnormal haemoglobins (HbS) are assessed individually. Full reports to Aviation Medicine Section are required.

2.10.9 Haemophilia

Applicants may be certified at the Class 2 level if the condition is stable. Full reports from the treating physician are required.
2.10 Haematology and Reticulo-endothelial Conditions

2.10.10 Oncology

Assessment of applicants with any diagnosis of malignancy is based upon the following considerations:

- Nature of tumour
- Stage of development/invasion
- Response to therapy
- Likelihood of recurrence in a form likely to be incapacitating, e.g. cerebral metastasis.

In general, applicants who are no longer receiving chemotherapy or radiotherapy, in whom the risk of incapacitation is considered to be low during the period of currency of the Medical Certificate, are given a pass assessment subject to continued medical surveillance.

Also see Section 2.14 Malignancy.

2.10.11 HIV Disease

Applicants who are HIV positive but without clinical disease may be certified at the Class 2 level and receive restricted certification (as or with co-pilot) at the Class 1 level.

Applicants should obtain reports (including CD4 helper cell count) from their treating physicians prior to seeking renewal.

When an applicant develops clinical illness associated with HIV disease, further certification is determined on a case-by-case basis. Full clinical details are required.

2.10.12 Blood Donation

In healthy individuals, the fluid depletion that accompanies donation of one unit of blood is replaced within several hours. Any effects from the loss of haemoglobin should not be significant for normal flying operations.

Active pilots should be discouraged from flying until 24 hours have elapsed following blood donation.
2.11.1 Applicable Regulations

CASR 67 With regard to the Skeletal System the CASR Part 67 states as follows:

CASR Part 67 Table 67.150 criteria for medical standard 1 states:

1.25 Is not suffering from safety-relevant active disease of the bones, joints, muscles or tendons
1.26 Is not suffering from safety-relevant functional sequelae of medically significant conditions of the bones, joints, muscles or tendons

CASR Part 67, Table 67.155 criteria for medical standard 2 states:

2.24 Is not suffering from safety-relevant active disease of the bones, joints, muscles or tendons
2.25 Is not suffering from safety-relevant functional sequelae of medically significant conditions of the bones, joints, muscles or tendons

CASR Part 67, Table 67.160 criteria for medical standard 3 states:

3.23 Is not suffering from safety-relevant active disease of the bones, joints, muscles or tendons
3.24 Is not suffering from safety-relevant functional sequelae of medically significant conditions of the bones, joints, muscles or tendons

2.11.2 Pain Management

Pain is a complex issue. Severity of reported pain is poorly correlated with the severity of the underlying condition. It is thus very important to identify the underlying condition and prescribe pain relief accordingly. The following discussion should be considered in conjunction with Chapter 13 of this handbook, dealing with certification issues and medication. Each drug group has an annotation, which places it in the category (A-E) as described Chapter 13.

Non-steroidal Anti-inflammatory Drugs (NSAIDs) (B)

In general, these medications (NSAIDs) are suitable for aviation duties, but with surveillance of possible adverse effects, particularly of gastric origin. The underlying condition for which they are prescribed needs to be considered in each case.
Cyclo-oxygenase type 2 (COX-2) inhibitors have been found to have an association with coronary disease and strokes in those already predisposed, through an effect on platelet function. It is generally advisable to cease COX-2 inhibitors unless the applicant has a history of peptic ulcer disease. Celebrex continues to be available and Mobic is now usurping the past popularity of Vioxx.

The older non-steroidal anti-inflammatory drugs, such as Ibuprofen, Feldene and voltaren continue to have a place.

Aspirin is effective as an anti-inflammatory agent, but has a significant risk of GI bleeding.

Paracetamol (A)

A maximum of four grams a day applies in the case of an adult, due to liver toxicity. It is not an anti-inflammatory agent, functioning in the main, directly on the brain to modify pain response in orthopaedic and rheumatological applications. Where the pain is purely mechanical, rather than inflammatory, Panadol may be the better option.

Disease Modifying Anti-Arthritic Drugs (DMARDs)

DMARDs have an important role in reducing symptoms from the condition for which they are prescribed. Where the pilot is being managed closely to identify any adverse effect early, and where there has been an adequate trial period—usually 4 weeks after commencing the medication —prior to return to flying or controlling, continued certification is usual. The extent of the functional effect from the underlying condition will be of significance in determining fitness for continued certification.

Salazopyrin (C). There are often side effects such as indigestion and hepatotoxic reactions, which largely occur in the first three months. Therefore, the individual should be closely monitored during this initial period of medication.

Gold (C). This is out of favour at present. It is toxic to bone marrow and can cause nephrotic syndrome.

Methotrexate (B). Toxic effects are revealed early. Full blood count and liver function testing is suggested every six to eight weeks.

D-Penicillamine (C). There is a range of side effects such as scleroderma, nephrotic syndrome, myasthenia gravis and marrow toxicity. If an individual is on this treatment without side effects for more than six months, it is likely that they will remain without side effects.

Luflunamide (C). In the early period there may be diarrhoea and skin rash. FBE, ESR and LFTs are needed regularly.
Cyclosporin, cyclophosphamide (C). Provides serious immune suppression, but with a high risk of side effects. Generally these are only used when the underlying disease is severe and would normally preclude certification anyway.

Biologic Agents, such as ana kina and anti-tumour necrosis factor preparations (B). Side effects do not appear to be severe. The high cost at present tends to limit their use to severe disease.

Narcotics (C)

It should be considered barring treatment using all forms of narcotics for individuals involved in aviation-related duties. In exceptional circumstances, consideration may be given to individuals requiring narcotic analgesia where:

- The condition itself poses no safety risk
- Narcotics have been used for an extended period and it is clear that there is no adverse effect on attention or cognition
- Neuropsychological testing demonstrates that there is no demonstrable decrement in performance
- ATC simulator testing and pilot in-flight testing indicates satisfactory performance
- There is no requirement to use the medication within 12 hours of commencing aviation activities
- There is no evidence of addiction to the analgesic.

Tramadol is gaining considerable popularity. While not an opioid, it does have narcotic effects and may be addictive. It has inconsistent effects and side effects, with neuropsychological side effects and causing serotonin syndrome. Panadeine Forte contains 30mg codeine and is a significant opioid dosage.

Those applicants taking narcotics are, in general, ones who self-select; that is, those experiencing significant side effects from the medication, or with significant problems from the underlying condition. They should not plan to fly. They may feel suitable for duty, but there may well be subtle impairments and self-delusion (ie overconfidence) that the pilot or controller may not identify.

Amitriptyline (C)

This is often prescribed in low doses of 25 to 50mg at night to augment sleep. It is a soporific and has a long half-life. Some people are highly sensitive and there are a number of cross-reactions. Many people will be 'slow to take off' after taking amitriptyline the night before.
Corticosteroids (B)

Corticosteroids are a mainstay of treatment in many rheumatological conditions. They can be administered dermally, orally, by eye drops, intra-articularly, injection into the affected soft tissue and intravenously. Local application, even by intra-articular injection, is generally safe. Systemic symptoms are rare. However, occasional sleeplessness and hypomania is observed. There should be no flying or controlling within 24 hours following a corticosteroid injection.

Oral corticosteroids have a large and diverse range of adverse effects. These include mood change, thinning skin, diabetes mellitus, immune suppression and osteoporosis. These are almost invariably time and dose related. A general cut-off for onset of side effects is greater than 10mg per day for more than six months. If more than 10mg per day is being prescribed, bone density assessment should be obtained every two years.

If taking oral medications such as dexamethasone or betamethasone, there should be a more intensive monitoring program, as there is a high incidence of side effects. It is important to understand why the individual has been placed on these medications rather than prednisone or prednisolone.

2.11.3 Functional Assessment

Range of movement

Neck range of movement (ROM) is the most important assessment for a DAME. Unless the restriction is severe, ‘trick’ movements are usually available to compensate for limited neck movement. Provided the pilot can evacuate himself and his passengers safely and rapidly, there is generally no impediment strictly due to ROM limitation.

In reporting to CASA, the ROM should be given in degrees in the three planes of movement, flexion/extension, lateral flexion and rotation.

Operational Assessment

A specific flight test to evaluate the functional impact of a restriction of movement due to an orthopaedic or rheumatological condition may be required. Each assessment will depend on the pilot, the aircraft type and the normal aviation activity undertaken.

A DAME may recommend directly to the certificate holder/applicant that such an assessment take place, or a recommendation can be forwarded to CASA for aviation medicine section to consider such an assessment. Where the DAME conducts the assessment from a referral, permission should be sought from the pilot for details of the impairment to be included in the referral letter. The letter to the pilot undertaking the assessment should be written in plain English, requesting advice of the functional effects on the certificate holder’s ability to carry out aviation duties. These may include cross control in strong crosswinds, or single engine flight in a twin-engine aircraft, the full and free movement of all flight controls, and ability to see unimpeded in all significant areas.
It is often beneficial to talk to the assessing pilot prior to the assessment to clarify the requirements. A Chief Flying Instructor of a registered flying school can perform the assessment, provided that the individual is prepared to conduct such an assessment. Tests directed to be undertaken by CASA aviation medicine section will usually be performed by an approved testing officer (ATO).

Should the pilot refuse permission for release of relevant medical information, there may be a limited capacity to properly assess the individual, and further testing may be required. The pilot should be made aware of the consequences of the refusal and an attempt made to reach agreement on what information can be imparted.

After commencing narcotic or opioid medication, the ATC or pilot should have a test equivalent to their regular test/training regime. For instance, a private pilot will need to bring forward a biannual flight test, and provide a report of that test as part of the assessment for certification.

### 2.11.4 Specific Conditions

**Arthritis**

**Rheumatoid arthritis (RA)**

RA often has systemic effects. It tends to be erosive, with the destruction of tissue. Joint deformity in the hand and grip weakness is likely to be the most significant issue for aviation. A normochromic normocytic anaemia of chronic disease is common and needs to be monitored. Sufferers can have a fairly normal life, particularly if the activity of the disease is controlled early. As a generalisation, people with Rheumatoid arthritis tend to function at a higher level than the extent and apparent severity of the disease would indicate. Fitness for aviation duties will be assessed on a case-by-case basis.

There may be ophthalmic effects, such as from the use of Plaquinil or steroids. If there are no signs or symptoms of ophthalmic involvement, there is no requirement for routine ophthalmic assessment beyond those stipulated based on age and Class of certificate.

RA should best be monitored for effective management by a rheumatologist rather than GP. An annual report from the specialist will usually be required as part of ongoing certification. Serial plain X-rays, FBE and ESR can follow disease progression and activity. LFTs are usually required to check for side effects of medication.
2.11 Orthopaedics and Rheumatology

Osteoarthritis (OA)

There may be primary osteoarthritis, without previous trauma to the joint, or secondary osteoarthritis where there is a predisposing injury. There is usually no inflammation, but Heberden's and Bouchards nodes in the hand do have an inflammatory component. The effects can be divided into functional limitations as a result of reduced range of movement and pain. Simple analgesics and physiotherapy are the mainstay of treatment. Unless there is a significant functional impact, sufferers from osteoarthritis will generally have unrestricted certification. Serial plain X-rays and testing for side effects of medication will be required, again on a case-by-case basis.

Seronegative polyarthritides

This may be rheumatoid arthritis where there is no rheumatoid factor detectable, or those associated with HLA B27. 8% of the Caucasian population are positive for HLA B27, and some 1% to 8% of these develop a seronegative polyarthritis. The most prominent type is Ankylosing Spondylitis (AS), but there is also Reiters syndrome, post-salmonella and post-yersinia infection and psoriatic arthritis.

Ankylosing spondylitis presents as a progressive stiffening of the lower back, with pronounced symptoms after extended inactivity, such as sleep. Physiotherapy modalities, exercise and NSAIDs are the most widely used treatment. It affects males to females in the ratio of 8:1. Sitting for a long time, such as in ultra-long haul sectors, may induce stiffness, but it is generally possible to regularly stand and perform stretches.

Gout

Gout tends to be poorly treated overall. It can be of sudden onset and disabling. There is increased risk from sitting, when dehydrated and post-surgical. Thus, the aviation environment does have significant risk for a gout attack.

Most attacks are in people who are poorly managed and who are not compliant with medication and diet.

More than three attacks a year, particularly where the serum urate is greater than 0.45, and tophaceous gout, where there is the presence of destructive articular disease demonstrating long-standing poor control, carries unacceptable risk of a further attack. Given that the onset can be sudden, within the length of a flight, and can be incapacitating, careful consideration will be given to making the pilot or controller unfit until adequate control is demonstrated. Control would be shown through uric acid levels, compliance with medication such as allopurinol, and avoidance of alcohol and other dietary modifications.
Psoriatic arthritis
This usually presents as mono or oligo arthritis, and affects around 8% of patients with psoriasis. It can be progressive and present similarly to rheumatoid arthritis. It should be considered on a case-by-case basis.

Lupus and Connective Tissue Disorders
There appears to be a reduction in numbers and severity of these conditions in the last 50 years. Systemic Lupus Erythematosus (SLE) is diagnosed mainly through a positive anti-nuclear factor and elevated anti DNA, but requires at least four criteria. DMARDs hydroxychloroquine and steroids are the mainstay of treatment. Multiple organs may be involved, including reticulo-endothelial with anaemia, and kidneys with proteinuria. When stable, SLE should be reviewed by a rheumatologist three-monthly, with certification usually being limited to 12 months. Annual reports will need to address any systemic involvement.

Polymyalgia Rheumatica
This generally presents as an acute illness, with equal sex ratio, and rarely under age 60. There is central joint involvement and night stiffness. It is usually well controlled with corticosteroids, of around 15mg of prednisolone per day. Once on treatment, there is a return to normal function within one month, and a gradual reduction in medication with cessation of medication over a period of around two years.

The condition can be relapsing, with the most serious effects being cranial arteritis, which may result in severe headaches and blindness. Visual loss can be sudden. This is rare once on steroids, and if ESR/CRP results are normal, risk is acceptably small.

All certificate holders should be monitored through three-monthly ophthalmology and rheumatology reviews, and three-monthly ESR tests. Certification is usual, provided the condition is controlled, with six- or 12-monthly validity. The relevant reports will be required for re-certification.

Osteoporosis
This condition is associated with a number of risk factors. These are:

- Chronic ill health
- Cigarette smoking
- Family history
- Systemic steroid use
- Post menopausal women
- Women with non-functioning ovaries.
It is less common in males, but still substantial, especially where testosterone levels drop.

In those with established osteoporosis, bone density estimation should be obtained three-yearly. In the presence of a fracture, bisphosphonates such as fosamax and actonel can assist. Weight-bearing exercise is important for prevention and treatment.

There is little immediate relevance in civilian flying if a fracture does not exist or has not occurred. Any fracture should be treated on its own merits.

**Chronic Fatigue Syndrome (CFS) and Fibromyalgia**

This is a diagnosis of exclusion as there is no specific diagnostic test. No pathology has ever been demonstrated to be the cause. It is widely assumed that a psychological disturbance underlies the presentation in most if not all sufferers. Symptoms are diverse, including sleep disturbance, trigger points, and depression. While fatigue is prominent, there is no change in oxygen consumption with exercise; the only detectible change is in terms of perceived effort. Treatment is prolonged and expectant, with anti-depressants widely prescribed. Rest should not be prescribed.

Most CFS patients are not motivated to continue flying while symptomatic. A psychiatric diagnosis should be excluded. While symptomatic, chronic fatigue syndrome is generally incompatible with aviation duties.

**Scleroderma**

In its severest form—progressive systemic sclerosis—this condition can have implications on flying. It is generally found in a population in their third and fourth decades and is more common in females. It can progress rapidly, and involve the hand, resulting in contractures, with marked functional limitation. It can be made worse in cold environments such as often encountered in cockpits with poor environmental control. The CREST syndrome (calcinosis, Raynaud’s, oesophageal involvement, sclerodactyly and telangiectasia) often involves pulmonary function, with 15% having pulmonary hypertension. It is important to maintain close supervision through rheumatology follow-up at least annually. Refined pulmonary function testing, CT of lungs and echocardiography will be needed where there is any suspicion of pulmonary involvement.

**Vasculitis**

Polyarteritis nodosum is the most common form. Vasculature anywhere in the body can be involved, and commonly includes the kidneys. Prognosis is always guarded, and certification will be based on history of extent and severity of disease and effectiveness of medication.
Spinal Injury

Whiplash

This condition is something of an enigma, as it tends to be described in only very limited contexts, particularly rear-end motor vehicle accidents. Pathology cannot be demonstrated experimentally. A lateral X-ray should be obtained acutely to exclude instability. A bone scan may be valuable at three weeks to identify bone or connective tissue damage.

Most cases settle very quickly. The principle method of rehabilitation is one of goal setting with steady improvement over several weeks.

Certification should be based on mobility and pain impact. Most cases can be managed by the DAME determining when the certificate holder is fit to return to aviation duties.

Stable fracture of the spine

There should be an expectation of a return to activities within 12 weeks, with an absolute maximum of 26 weeks. The ability to withstand prolonged sitting will be the main decider.

Non-stable fracture of the spine

Where there is operative treatment with insertion of a plate, recovery will be in 12 to 26 weeks. With two fracture levels, there is a longer recovery time, but practically all return to full activity.

Posterior ligament rupture

This is potentially unstable, where two of the three columns in the spine are damaged. Return is based on the treating orthopod advice, but usually should be three months before returning to flying activities.

Spinal fracture with cord lesion

Nearly all such patients will have fixation with pedicle screws. Recovery is usually based on force of injury. It will be necessary to wait for the assessed maximal recovery, and see how the individual is able to function. Urinary tract obstruction is often the main problem. Modifications to the cockpit, such as a Blackwood Pole for pedal manipulation can potentially still permit some flying.

Paraplegia

Once stable and functioning satisfactorily utilising a range of mechanical aids, should the individual wish to undertake aviation activities, functional testing will be required. The main issues will be mobility around the cabin, particularly full and free manipulation of flight controls and emergency egress.
Spinal Stenosis

The diameter of the cord is 11 mm minimum. Where the diameter is less than this, symptoms may occur. Pathology is often found in the lumbar region. There may, however, be smaller sizes found in scans, which have no symptoms. Where the neck is involved, there will usually be a myelopathy. The condition is usually slowly progressive, with nerve root pressure and neurologic claudication. Sitting does not affect the condition significantly, and the result is that pilots are affected very little.

Syringomyelia

This condition is more common in males, and is mostly an incidental finding. Symptoms, when present, tend to be vague, with difficulty in fine motor control in the hands. There is an asymmetric abdominal reflex. An MRI will show Arnold-Chiari malformation or a syrinx. Where there are symptoms, there is usually drainage of the syrinx, and reassessment. Most will be able to continue flying unrestricted.

Scheuermann's Disease

This abnormality of bony development is predominantly found in the lower thoracic vertebrae in males. Longitudinal studies have indicated that it has minimal impact in the long-term, and should not affect flying. Occasionally there is significant scoliosis, which requires a brace for about six months.

Spondylosis

This is an injury to the pars interarticularis. It is not congenital, but is found in 5% of boys by the age of five years. This varies by family history and racial background, and is more common in males. It can occur as a result of overuse in gymnasts and fast bowlers in particular. Rest and attention to technique is the core of treatment.

Spondylolisthesis involves a bilateral lesion with slippage of one vertebral body on the one below. When the slip is at risk of compromising the cord, or there is disability, surgery may be required. There may be some pain or discomfort but generally this does not preclude work.

There is little to suggest that there are any issues for aviation.

Scoliosis

When scoliosis is less than 30° it is of little consequence. Once at 50-60° at the end of its growth, it is often progressive and requires surgical intervention. There is little impact on function or on flying.
Backache

Backache, usually lumbar, is very common. Early normalisation of activities is the cornerstone of treatment. Avoidance of twisting is helpful. The few that are not cured within six to 12 weeks should be assessed in a rehabilitation program to seek an underlying problem.

In rotary wing aircraft, the normal posture of forward bending and lateral flexion tends to induce backache. No degeneration is reported from repeated minor stressors. It is usual to not complain of such pain until after retirement from aviation.

Sciatica

This is leg pain as a result of pressure on nerve roots. Back pain may also be present, but the leg pain is usually much more prominent. Treatment is expectant, with 50% improvement in 12 weeks, 80% in two years and 95% in five years, while surgery (laminectomy) has a 95% success rate. Recurrence is around 1-2% per annum.

It is possible to be fully active with sciatica without the risk of further damage. Thus, return to flying should be based on symptoms and need for medication.

Loss of Limb

Amputation should be considered on the basis of function. Occasionally, phantom pain or a neuroma in the stump can cause discomfort, but this is rare and can be adequately managed. Should the loss of limb be due to a tumour, the risk of recurrence must be taken into consideration.

Above-knee amputation as opposed to below-knee amputation will have a major impact on functionality. The pilot must be able to demonstrate the ability to fully operate the rudders, or modify the aircraft accordingly. A double above-knee amputee is unlikely to be able to fly an unmodified aircraft due to the inability to generate sufficient force to operate the rudders.

Upper limb prostheses that are most functional are not necessarily the most ‘natural’ in appearance, often being hooks. The loss of digits makes fine manipulation difficult.

Shoulder Injury

Rotator cuff injury. Most commonly, this is due to supraspinatus tear, and recovery is good. Physiotherapy, with up to three steroid injections can be helpful. Arthroscopic inspection can be useful to identify the pathology more accurately. Ultrasound is not helpful unless the sonographer is very experienced. Time to recover can be from 6 weeks to two years. Once able to move the affected arm through an arc in the functional area, the individual can be returned to flying. Surgical repair is sometimes necessary in the young patient.
Shoulder instability. Three episodes of subluxation or dislocation in a single direction should lead to surgical repair. Where there is multidirectional instability with ligamentous laxity, surgical repair is unhelpful, and effort should be directed to conservative treatment of maximal rehabilitation effort. Strength and balance of muscles is needed to overcome the ligamentous injury.

Frozen shoulder. Early treatment of frozen shoulder with local and oral corticosteroids has been reported as beneficial. In chronic, established cases the orthopaedic aim is to break down adhesions limiting the range of movement and causing pain. Early intervention with manipulation under anaesthesia and steroid injections usually results in recovery. Once again, ability to move in the functional arc for flying is needed before return to flying should be considered.

**Lateral Epicondylitis**

This condition may be encountered in a number of circumstances, usually involving repetitive activities. The core of the treatment is physical therapy with graduated exercises to increase strength and endurance, remediation of the causative activity, and steroid injections into the affected tendon complex are beneficial. Resumption of activity too soon often results in recurrence. Each case should be considered in its merits, based on forearm strength and exacerbating actions.

**Carpal Tunnel Syndrome**

Typical CTS symptoms involving the median nerve distribution at the wrist, will often respond to conservative treatment modifying activities combined with steroid injection. Surgery is usually curative. With arthroscopic surgery in experienced hands, the individual can return to work within four weeks, while open surgery recovery requires somewhat longer. Return to flying will be based on an assessment of strength and endurance of the wrist.

**Upper Limb Fractures**

The presence of a plaster is a difficult situation to assess. It is best to not attempt to fly while there is an upper limb plaster in place. A better option from the aviation perspective is usually a pin, possibly with a small splint, which will permit continued activity.

Each case needs to be based on functional capability, which should be assessed by the DAME. If there is a desire to fly while there is a plaster in place, or there is doubt about functional capacity, then a functional test, carried out by a CFI or ATO would be appropriate.
Lower Limb Fractures

Lower limb fractures often take 6 months to heal adequately for normal function. However, many fractures are pinned, or can have an inflatable plaster that is only inflated when putting stress through the bone. Thus, most lower limb fractures will be compatible with continued flying. The DAME should assess likely functional limitations of aviation relevance.

Knee Derangement

Following an anterior cruciate ligament rupture, there will be a period where the pilot is unfit for flying. Without surgery, this is likely to be around six weeks. With surgery, the expectation would be around three months. Medial collateral ligament tear will have little impact on flying.

Arthrodesis

Following an arthrodesis, activity is generally near normal. For flying, a hip arthrodesis will be nearly impossible due to the limitation of mobility. Knee arthrodesis is difficult and will require in flight assessment, while ankle arthrodesis should not produce significant difficulties.
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2.12.1 Ear, Nose and Throat Standard – CASR Part 67

CASR 67.150 For medical standard 1
Table 67.150
For medical standard 2
Table 67.155
For medical standard 3
Table 67.160

2.12.2 Hearing Requirements Standard – CASR Part 67

CASR 67.150 For medical standard 1
Table 67.150
For medical standard 2
Table 67.155
For medical standard 3
Table 67.160

2.12.3 Examination of the Ear

There should be no signs of active disease of the middle ear cavity. Applicants should be able to ventilate the middle ear.

Perforations of the tympanic membrane are acceptable, however the cause of the condition should be sought and investigations initiated, if appropriate.
2.12.4 Hearing

An applicant for a Class 2 Certificate must be able to hear an average conversational voice at two metres with the back to the examiner. Accordingly, applicants who are deaf in one ear may pass.

More rigid standards apply to professional licence holders. Audiograms are required for initial Class 1 and 3 and at defined intervals thereafter.

If any doubt arises as to the acceptability of an applicant's hearing, an audiogram should be obtained and, if appropriate, specialist consultation recommended. The audiogram printout should be enclosed with the medical report for initial issue Class 1 and 3 examinations.

Audiograms are acceptable from any qualified audiologist. Where the deficit is long-standing and has been previously recorded, an audiogram should be provided to demonstrate that there has been no significant deterioration.

If a supplementary speech test is required, this should only be performed by an audiologist provided calibrated tapes and other required equipment are available.

If the applicant fails the speech-based hearing test, in some cases an in-flight test may be offered if he/she has a high level of aeronautical experience. Such an operational check will involve evaluation of relevant aspects of the applicant’s hearing by a CASA Flying Operations Inspector or an Authorised Testing Officer with test material transmitted from a control tower. Ideally the test should be conducted in the class of aircraft, which is the same as that which the applicant normally operates or intends to operate.

Applicants for Class 2 Certificates may wear hearing aids during testing. Any applicant who meets the hearing standard in this way is required to wear the aid during all communications on the ground that relate to the conduct of a flight. Adequate amplification during flight may be achieved by the use of headphones. Headphones with ear cups have the added advantage of blocking out aircraft noise. All pilots should be encouraged to fly with headphones, in the interests of improving hearing and for hearing conservation.

2.12.5 Vestibular Function

Any history of vertigo or dizziness should be fully investigated and the presence of nystagmus noted. If there is concern about vestibular function, referral for caloric testing and electronystagmography should be considered.
2.12.6 Speech

Any significant speech impediment or stuttering should be reported, and full details are required. As a minimum, reports from an ENT specialist and from a speech pathologist should be obtained and forwarded to Aviation Medicine Section, together with the DAME’s own assessment of the condition and its likely effects on the safety of air navigation.

2.12.7 Sinuses

Applicants with acute sinusitis are "temporarily unfit" for aviation duties. Chronic sinusitis is unacceptable until appropriately referred, treated and improved.
2.13 Medication – Drugs and Flying/Controlling

2.13.1 Introduction

The increasing use of drugs, both prescribed and self-administered, within the Australian community, presents a significant challenge to DAMEs when determining an applicant’s fitness for aviation related duties. All drugs, even those purchased “over the counter (OTC)”, may have adverse effects that may render aircrew members or air traffic controllers unsafe to fly or to perform their normal duties.

General Principles

As a general principle, DAMEs should assume all medications are hazardous for aviation operations until demonstrated otherwise.

When assessing whether a pilot or Air Traffic Controller (ATC) taking medication is fit for aviation-related duties, two principal issues should be considered:

- The potential for the underlying medical condition to affect fitness for flying or controlling duty
- The potential for the treatment (including drug therapy) to reduce fitness for flying or controlling duty.

The following characteristics of specific compounds will influence the limitations on their safe use in the aviation environment:

- Unwanted, dose-related drug effects (e.g. blurred vision or drowsiness)
- Hypersensitivity/allergic reactions
- Idiosyncratic effects
- Drug side effects that may occur in some of the population (e.g., nausea, liver damage or bone marrow suppression)
- Drug combination effects – potentiation
- Drug interactions; particularly with alcohol, to increase risk of side effects or reduce activity of the drug/s.
Virtually all drugs unacceptable for aviation duties, regardless of the nature of the disorder being treated, have one or more of the following effects:

- CNS depression
- CNS stimulation
- Autonomic nervous system disturbance
- Disturbance of equilibrium.

**Determination of Fitness for Aviation Duty when Taking Medications**

It is not practicable in this chapter to indicate whether a specific drug or even class of drug is always compatible with safe flying or controlling. Rather, this chapter provides a general overview of many commonly used medications and their use in the flying environment. Whenever a DAME is in doubt about a pilot or controller who is taking a drug or medication, advice should be obtained from the CASA Aviation Medicine Section.

With regard to their effect on fitness for aviation duties, medications may be divided into five groups:

A. Those medications considered safe when flying or controlling.

B. Those medications generally considered compatible with aviation duties without restrictions once the possibility of idiosyncratic reaction has been eliminated (generally after a period of ground trial). Applicants using these substances may be cleared to exercise the privileges of their licences by a DAME.

C. Those medications which may be compatible with aviation duties, but which require a specific assessment by CASA. Only CASA can clear pilots and ATCs to use these drugs while performing aviation-related duties.

D. Drugs that are not compatible with flying or ATC duties.

E. Those medications that do not fit any of the above groups, or where there is uncertainty. In such cases, the DAME should either:
   - Contact CASA’s Aviation Medicine Section prior to any decision to certificate or not certificate a licence holder or applicant; or
   - Not endorse the certificate and refer the matter to AMS for determination.
A. Medications compatible with flying or controlling

The following medications may be taken without consultation:

- Simple analgesics such as single doses of aspirin, paracetamol, and ibuprofen to provide analgesia may be used for minor self-limiting conditions. Paracetamol is preferable as there is less risk of gastric irritation. Medications containing Codeine should not be used for this purpose.

- Simple antacids may be used for mild isolated episodes of gastric disturbance. Mixtures containing anticholinergics or antispasmodics should not be used by an applicant engaged in aviation duties. Simple antacids do not include H₂ receptor antagonists.

- Antidiarrhoeals such as kaomagma, kapectate and bismuth subcitrate are acceptable for mild afebrile diarrhoea.

- Nasal sprays such as oxymetazoline or phenylephrine, to be used as a ‘get-me-down’ should unexpected ear or sinus block occur during flight.

- Non-prescription suppositories and topical anorectal ointments/creams used to treat simple haemorrhoids.

- Topical medications including antiseptics, topical acyclovir, antifungals, weak steroid creams or benzoyl peroxide used for minor wounds and skin conditions, vaginal creams/pessaries and suppositories.

Note: Schedule 4 (prescription only) items such as topical antibiotics and tretinoin skin applications are not included.

- Oral Contraceptive Pill (combined OCP or mini-pill), injectable progesterone contraceptives and implantable progesterone contraceptives.

- Nicotine gum, patches or sprays used for smoking cessation.

- Steroid nasal sprays used to treat hay fever.

- Moistening or simple astringent eye drops

B. Medications requiring ground trial before DAME approval of use when flying or controlling

Pilots and ATCs taking the following medications require a ground trial (and/or AMS consultation) prior to DAME approval to fly or control:
2.13 Medication – Drugs and Flying/Controlling

- **Anaesthetics.** Medical certificate holders require clearance from a medical practitioner following the administration of any anaesthetic agent:
  - Minimum of 12 hours following local or regional (including dental) anaesthetics. (The condition for which the anaesthetic has been administered must also be considered prior to returning an individual to flying or controlling duties).
  - Minimum of 48 hours following general, spinal or epidural anaesthetic. This proscription includes drug-induced sedation. (The condition for which the anaesthetic etc has been administered must also be considered prior to returning an individual to flying or controlling duties).

- **Hypnotics.** Medical certificate holders should not fly or control for at least 12 hours after ingesting the sleep-inducing agent Temazepam. Medical certificate holders should not fly or control for at least 8 hours after using the sleep-inducing agent Zolpidem. Pilots and ATCs who use Temazepam or Zolpidem should not combine these drugs with alcohol. The use of the sleep-inducing agent Triazolam is not compatible with flying or controlling duties due to its potential CNS side effects. The use of Melatonin is not supported by CASA due to variation in its formulation and variability in its effects.

- **Antibiotics (oral and topical).** Medical certificate holders may continue to undertake flying or controlling duties when taking antibiotics provided:
  - the infectious condition being treated will not significantly interfere with aviation-related activities and will not be exacerbated by the specific operating environment, and
  - the prescribing medical practitioner or DAME has determined there are no adverse drug reactions from the antibiotic which has been prescribed. This would normally involve a short (approximately 48 hour) ground trial or previous use of the same antibiotic.

- **Immunisations.** Medical certificate holders should not undertake aviation-related duties for 24 hours after receiving the following vaccinations (primary and boosters):
  - Adult diphtheria and tetanus
  - Poliomyelitis
  - Hepatitis A & B
  - Measles, mumps, rubella
  - Yellow fever
  - Typhoid
  - Tuberculosis (Mantoux Test or Bacille Calmette-Guerin);
  - Influenza
  - Varicella
  - Meningococcal
  - Pneumococcal
  - Cholera.
Class 3 medical certificate holders receiving these vaccinations will usually remain fit for duty, but should consult a GP or DAME in individual cases of doubt.

After receiving the following immunisations (primary and boosters) there should be no aviation-related duties for a minimum of 72 hours:
- Japanese Encephalitis.

### Non-sedating antihistamines

### C. Medications which may be compatible with aviation duties, but which require specific assessment by CASA

For many of the following medications, it is important to note that they will be prescribed to treat particular conditions. Refer to the relevant section regarding certification requirements for that condition as well as to the issues discussed here.

CASA approval is required prior to pilots and ATCs who are taking the following classes of medications returning to flying or controlling duties:

- **Sedating Antihistamines:**
  - These should only be used when there is at least 12 hours between use and commencing aviation-related duties.

- **Antihypertensives:**
  - ACE inhibitors
  - Calcium channel blockers
  - Diuretics
  - Beta blockers.

- **Antiarrhythmics:**
  - Quinidine
  - Disopyramide
  - Verapamil
  - Amiodarone
  - Digoxin.

- **Gout medications:**
  - Allopurinol (colchicine is not usually suitable)
  - Probencid
  - Non-steroidal anti-inflammatory medications.

- **Hypolipidemic drugs:**
  - HMG-COA reductase inhibitors
  - Gemfibrozil (gemfibrozil and statin medications are not to be used together)
  - Cholestyramine (colestipol is not suitable).
- **Ophthalmological preparations:**
  
  It is possible for patients to absorb sufficient beta-blocker through ocular administration to affect cardiovascular response to exertion/exercise.
  
  - Timolol (glaucoma)
  - Betaxolol (glaucoma).

- **Thyroid disease:**
  
  - Thyroxine requires a 14-day trial.

- **Antidepressants.**
  
  - Selected non-sedating selective serotonin reuptake inhibitors (SSRIs) require a minimum of 28 days ground trial. The underlying condition should be considered prior to returning the aviator to duty. MAOIs and tricyclic antidepressants are not generally considered compatible with aviation-related duties. (Also see section 2.6 Psychiatry.)

- **Other medications:**
  
  - **Oral acyclovir** or **famcyclovir** for genital herpes
  - **Griseofulvin** or **terbinafine** for systemic antifungal therapy requires a 28-day trial. Monthly liver function testing is required
  - **Omeprazole** for oesophagitis and peptic ulceration maintenance therapy, following endoscopic confirmation of ulcer healing
  - **Ranitidine** for peptic ulceration maintenance therapy, following endoscopic confirmation of ulcer healing
  - **Clomiphene** to enhance oogenesis
  - **Sucralfate** for non-ulcerative GI symptoms
  - **Tetracycline** (low dose, for long term treatment of acne)
  - **Sulfasalazine** for prophylaxis of well controlled ulcerative colitis
  - **Sulfamethoxazole/trimethoprim** for chronic urogenital tract infections.

When these classes of medications are prescribed, the following actions should be taken:

- **Ground trial:** The length of the ground trial will be determined on a case-by-case basis in consultation with CASA Aviation Medical staff, and will also depend on control of the underlying disorder and any side effects of the medication.

- **Consultation:** The DAME should contact CASA Aviation Medicine Section to discuss specific requirements for an applicant using or proposing to use any medication whose side effect profile is unknown or of possible concern.
D. Medications not acceptable for/not compatible with aviation related duties

The following medications are not compatible with aviation related duties and are never to be approved for use by a medical certificate holder without prior specific written approval by CASA.

- Narcotics
- Insulin
- Amphetamine
- Cytotoxics
- Psychotropic medications
- Anticoagulants
- Nitrates
- Complex antidiarrhoeals. Mixtures containing antispasmodics (eg, Lomotil, Imodium) are not usually compatible with aviation-related duties.

E. Other medications such as vitamins, minerals and herbal preparations

Aircrew are to treat herbal medications as they would any other OTC medication. There is a potential for unforeseen consequences when taking such preparations and aircrew and ATCs should consult a DAME for advice before taking such medications and performing aviation-related duties.

Vitamins, minerals and dietary supplements

In Australia, all medicinal therapeutic products must carry an AUST L or AUST R number on the label, unless exempt. Vitamins and minerals are considered listed therapeutic goods meaning quality and safety factors have been assessed by the Therapeutic Goods Administration. In general, pilots and ATCs should not exceed the Recommended Daily Allowances for these products.

Herbal preparations

Herbal preparations are widely available in the community, and are seen by many as a “natural” alternative to conventional medicine. Unfortunately, such agents are not always subject to the same stringent regulations that apply to registered medicinal compounds as noted above. In addition, many of these preparations contain agents that may interact with other drugs and have the potential to cause side effects that are incompatible with flight safety. CASA considers routine use of herbal preparations as being incompatible with flying or controlling duties.
Herbal preparations are derived from plant parts or oils. One should bear in mind that there are no standards for quality, potency, safety or efficacy in their manufacture. Identical products may differ markedly between manufacturers or batches by the same manufacturer. Additionally, many drugs are derived from the same plants used in the herbal preparations. Therefore, many herbal preparations have the same potential side effects as manufactured drugs.

Several herbal preparations present particular threats to aviation safety, alertness, or physical well-being. Below are some of the herbal preparations known to be potentially dangerous.

- **Hallucinogens.** The following may cause hallucinations or disorientation:
  - Californian poppy
  - European mandrake
  - Kava-kava
  - Magic mushrooms
  - Nutmeg (in doses greater than a tablespoon)
  - Periwinkle
  - Thorn apple
  - Yohimbe bark.

- **Sedatives.** The following may cause drowsiness, slow reaction time, or disorientation:
  - Celandine
  - Deadly Nightshade
  - Hemlock
  - Henbane
  - Hops
  - Indian snakeroot
  - Jimson weed
  - Jin bu huan
  - Opium poppy
  - Passion flower
  - Scopolia
  - Skullcap
  - Valerian
  - Wild lettuce
  - Wolfsbane.
2. Medical Aspects

2.13 Medication – Drugs and Flying/Controlling

- **Cardiovascular effects.** The following may cause heart palpitations or precipitate myocardial ischaemia/infarction.
  - Broom
  - Ephedra
  - Indian snakeroot
  - Lily of the Valley
  - Pheasant’s eye
  - Purple foxglove
  - Squill
  - Stophanthus
  - White squill
  - Yellow foxglove.

- **Liver poisons.** The following may cause drowsiness, slow reaction time, or disorientation:
  - Borage
  - Chapperal
  - Colts foot
  - Comfrey
  - Germander
  - Life root
  - Thread leafed groudsel.

The DAME often lacks clinical information sufficient to be able to quantify the aeromedical risk from use of herbal preparations. The following questions will be of benefit in evaluating the safety (or otherwise) of these agents:

- Is the use of the preparation due to signs or symptoms that suggest an underlying medical problem separate from the preparation in question?
- Is any component known to have neuropsychotropic effects?
- Is the preparation likely to contain unlabelled or incorrectly labelled ingredients?
- Is the preparation being used in a dose range far outside that of current experience or in an extremely concentrated form?
- Is any component of the preparation known to cause physical harm (even infrequently, unless the quantified incidence of adverse effects is known)?
- Is the preparation an alcohol-based tincture, tonic or elixir?

If all answers are negative, it is difficult to justify prohibition of the particular agent. Any positive answers must be dealt with by education, treating the underlying condition, not endorsing the medical certificate, or referring the matter to Aviation Medicine Section at CASA.
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2.14 Malignancy

2.14.1 Introduction

Malignancy poses a threat to flight safety for a number of reasons including:

- Direct effect(s) of the primary tumour
- Effect(s) of secondary spread
- Effect(s) of treatment modalities
- Psychological effect
- Cachexia
- Endocrine or Biochemical disturbances.

Any pilot or Air Traffic Controller (ATC) diagnosed with a malignancy must refrain from aviation or air traffic control duties until fitness to return to such duties is assessed by CASA.

Automatic return to flying or controlling status should not be assumed. Some pilots and ATCs may be medically certificated following diagnosis and adequate treatment of their malignancy, provided there is an adequate program of ongoing surveillance. Others will require a lengthy period prior to certification due to ongoing symptoms or the risk of recurrence of the primary or metastatic spread. In some circumstances re-certification will not be approved.

Prior to medical certification on a pilot or ATC suffering from cancer, CASA must be sure that an applicant:

- Has recovered from the primary treatment
- Has no sign of residual tumour, of tumour spread or of secondary manifestations of tumour
- Is psychologically stable enough to undertake aviation duties.

Re-certification will depend on the likelihood and type of recurrent disease and the risk that it will adversely affect flight safety.
2.14.2 Principles of Aeromedical Certification of Pilots/ATCs with Malignancy

When considering the aeromedical risk (and therefore the risk to aviation safety) posed by a pilot or ATC suffering from a malignancy, CASA will evaluate:

- Cancer specific issues such as:
  - The type of cancer (tissue and histological diagnosis)
  - Likelihood of recurrence
  - Site of recurrence
  - Presence of any para-neoplastic syndromes
  - Potential for a recurrence to cause overt or subtle in-flight incapacitation.
- Issues related to the treatment of the cancer.

2.14.3 Cancer Specific Issues

Histological variants of a particular tissue cancer may behave biologically differently from other variants. Therefore, when assessing the aeromedical risk of a pilot or ATC with a malignancy, accurate tissue diagnosis of the malignancy is essential.

Complications of the Malignancy

Potential complications of malignancy will affect CASA’s assessment of fitness for aviation related duties. Malignancy may lead to pain, wasting, neuropathy, nausea, anorexia, seizures, hypercalcaemia, hyperuricaemia, viscus obstruction, and organ failure. Some cancers have para-neoplastic syndromes associated with their presence. These syndromes result from excessive or ectopic hormones synthesized by a tumour, immune complexes, ectopic receptor production, or release of physiologically active compounds and may manifest in a variety of ways. Most para-neoplastic syndromes have serious implications for aviation safety.

Likelihood of Recurrence

Figure 1 depicts the overall survival curve for individuals diagnosed with a theoretical malignancy. For most cancer types, annual recurrence rates can be calculated from survival curves. (As cure following recurrence is rare, overall survival approximates recurrence).
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Staging

Recurrence rates are greatly influenced by the stage of disease when primary treatment occurred. Many cancers are staged using a TNM (Tumour, Node, Metastasis) classification. Figure 2 depicts the variation in survival rates for a theoretical cancer according to the degree of spread evident at diagnosis.

Tumour Marker

Tumours may synthesize proteins that produce no clinical symptoms, eg, β-human chorionic gonadotropin, α-fetoprotein, carcinoembryonic antigen, CA 125, and CA 153. These protein products may be used as tumour markers in the serial evaluation of patients for determining disease recurrence or response to therapy. These markers may assist CASA in assessing the suitability of a pilot or ATC to return to aviation duty, as they can often be valuable in tracking response to treatment or recurrence of disease.
2. Medical Aspects

2.14 Malignancy

Site of recurrence

Each tumour has a characteristic pattern of recurrence. Thus for a theoretical tumour, metastases might occur according to the distribution indicated in Table 1.

Table 1: Distribution of metastasis for a theoretical cancer

<table>
<thead>
<tr>
<th>Site</th>
<th>Incidence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local and lymph nodes</td>
<td>60</td>
</tr>
<tr>
<td>Liver</td>
<td>20</td>
</tr>
<tr>
<td>Lung</td>
<td>10</td>
</tr>
<tr>
<td>Bone</td>
<td>5</td>
</tr>
<tr>
<td>Bone marrow</td>
<td>3</td>
</tr>
<tr>
<td>Brain</td>
<td>2</td>
</tr>
</tbody>
</table>

Risk of particular metastasis causing incapacitation

Several assumptions are made when assessing the risk of a particular metastasis causing incapacitation (either subtle or overt). For a theoretical cancer, recurrence in a regional lymph node carries a relatively small risk of incapacitation. On the other hand, brain metastasis has a near-100% potential for incapacitation (whether sudden due to a fit or bleed, or subtle as a result of pressure effects or headache etc). Thus the incapacitation risk weighting for a theoretical cancer may be as depicted in Table 2.

Table 2: Notional risk of incapacitation from metastasis

<table>
<thead>
<tr>
<th>Site</th>
<th>Incapacitation weighting (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local and lymph nodes</td>
<td>1</td>
</tr>
<tr>
<td>Liver</td>
<td>5</td>
</tr>
<tr>
<td>Lung</td>
<td>5</td>
</tr>
<tr>
<td>Bone</td>
<td>5</td>
</tr>
<tr>
<td>Bone marrow</td>
<td>20</td>
</tr>
<tr>
<td>Brain</td>
<td>100</td>
</tr>
</tbody>
</table>

Total risk of incapacitation

From the parameters defined above, a total risk of incapacitation can be calculated:

- Recurrence rate per year for the particular stage of the malignancy
- Frequency of metastatic disease in a particular organ
- Risk that metastasis in that organ will cause incapacitation.
Thus for an early stage cancer, the result of a calculation of the risk of incapacitation from brain metastasis may be:

\[
3\% \times 3\% \times 100\% = 0.09\% \text{ for the first year}
\]

For a theoretical late stage cancer from bone marrow metastases, the risk may be:

\[
15\% \times 3\% \times 100\% = 0.45\% \text{ for the first year.}
\]

In order to determine the overall risk, it is necessary to add the risks from all the possible recurrence sites.

### 2.14.4 Treatment Related Issues

In general, cancer is treated in one (or a combination) of the following ways:

- **Surgery** is the commonest treatment for malignant disease, and often is the only treatment. Aeromedical certification after surgery for cancer depends on the extent and success of the operation. Complications of surgery are considered on their merits, taking into account the underlying medical condition and the overall health of the affected individual.

- **Radiotherapy** is usually delivered as an intensive course. The aim may be curative, for example where an isolated group of lymph nodes have been shown to contain malignant cells, or as adjuvant therapy where lymph nodes are assumed to contain metastatic tumour. During the active part of radiotherapy treatment, pilots and ATCs will be assessed as temporarily unfit for duty. Following radiotherapy many patients suffer non-specific systemic effects, such as tiredness, malaise and nausea, which makes it inappropriate for them to partake in aviation activities at least until such effects have resolved. Occasionally there are long-term effects after radiotherapy, such as scarring, which may preclude fitness for aviation duties.

- **Chemotherapy.** During acute chemotherapy treatment (whether curative or adjuvant), pilots and ATCs will be assessed as temporarily unfit, as all chemotherapy drugs are cytotoxic, and frequently have a significant effect on normal tissue, such as rapidly dividing cells in the bone marrow. Once active chemotherapy has ceased and side effects have resolved, aeromedical certification may be possible and will be considered on a case-by-case basis. In some cases low doses of chemotherapy agents may be prescribed as maintenance therapy. Where CASA considers that such medications do not reduce aviation safety, aeromedical certification may be considered, also on a case-by-case basis.
2.14 Malignancy

**Hormonal therapy.** Endocrine therapy is used as part of the treatment of some cancers (such as hormone and anti-hormone treatment following breast and prostate cancer). Pilots and ATCs may be returned to flying or controlling if there are no side effects from their hormonal therapy. In all cases, the decision to return to duty while on cancer chemotherapy will be made by CASA Aviation Medicine Section (AMS), on a case-by-case basis, when absence of adverse disease effects is confirmed.

**Complementary or alternative medicine.** These modalities are commonly used by patients in the treatment of malignancy, particularly where the primary treatment modalities have failed to produce a cure. Where such treatments are used in the presence of continued active disease, the applicant is assessed as unfit. Where the treatment is used to prevent onset of malignancy or recurrence, the treatment will be considered on a case-by-case basis, with regard to the individual’s overall health and the potential effect of the treatment. Herbal medications are discussed in Section 2.13 Medication. All such cases should be referred to CASA AMS for consideration.

### 2.14.5 Specific Malignancies

The commonest forms of malignant disease in the Australian pilot and ATC population are (in order):

- Prostate cancer
- Malignant melanoma
- Bowel (colon) cancer
- Non-Hodgkin’s lymphoma
- Cancer of the testis (multiple types)
- Bladder cancer
- Kidney cancer
- Cancer of the rectum/anus
- Breast cancer
- Hodgkin’s lymphoma.

The following discussion relates to the five most commonly encountered malignancies in the aviation population in Australia, as well as Hodgkin’s Disease. Information on re-certification following diagnosis with such malignancies is to be taken as guidance and indicative only. CASA will address each case individually and make a decision based on its unique issues. In general, DAMEs and certificate applicants may anticipate an outcome along the lines described as a way to plan for possible grounding periods. Applicants should endeavour to provide specialist evidence and opinion to refute the guidance below should there be a request to return to multi-crew or solo flying or controlling prior to the times indicated.
2.14 Malignancy

**Prostate Cancer**

Adenocarcinoma of the prostate is the commonest malignancy in men aged 50 years or more in Australia, and the incidence increases with each decade of life. Hormonal influences undoubtedly play a role in the aetiology of adenocarcinoma. Grading is based on architectural patterns and is commonly reported as the Gleason score: the primary (most prevalent) grade (1-5) plus the secondary (next most prevalent) grade (1-5); thus, it ranges from 2 (very well differentiated) to 10 (very poorly differentiated). Staging is described in Table 3.

**Table 3: Staging of prostatic cancer**

<table>
<thead>
<tr>
<th>Staging System</th>
<th>Characteristics of Tumour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whitmore</td>
<td>AJCC/TNM</td>
</tr>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>T1</td>
<td>Is clinically inappropriate by palpation or imaging</td>
</tr>
<tr>
<td>T1a</td>
<td>Is an incidental finding in ≤ 5% of resected tissue</td>
</tr>
<tr>
<td>T1b</td>
<td>Is an incidental finding in &gt; 5% of resected tissue</td>
</tr>
<tr>
<td>T1c</td>
<td>Is identified by needle biopsy performed for an elevated prostate-specific antigen level</td>
</tr>
<tr>
<td>B</td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td>Is palpable or reliably visible on imaging; is confined to prostate</td>
</tr>
<tr>
<td>T2a</td>
<td>Involves one lobe</td>
</tr>
<tr>
<td>T2b</td>
<td>Involves both lobes</td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>Extends through the prostatic capsule</td>
</tr>
<tr>
<td>T3a</td>
<td>Has extracapsular extension (unilateral or bilateral)</td>
</tr>
<tr>
<td>T3b</td>
<td>Invades seminal vesicles</td>
</tr>
<tr>
<td>D</td>
<td></td>
</tr>
<tr>
<td>T4</td>
<td>Is fixed or invades adjacent structures</td>
</tr>
</tbody>
</table>

AJCC = American Joint Committee on Cancer

TNM = tumour node metastasis

**Symptoms, Signs, and Diagnosis**

Prostatic cancer is usually slowly progressive and may cause no symptoms. In late disease, symptoms of bladder outlet obstruction, ureteral obstruction, and hematuria may appear. Metastases to the pelvis, ribs, and vertebral bodies may cause bone pain. Carcinoma is often diagnosed incidentally when malignant changes are found in the tissue removed during surgery for suspected benign prostatic enlargement.

Elevated serum acid phosphatase or Roy test (an enzymatic method) correlates well with the presence of metastatic prostate cancer, particularly in lymph nodes. Although acid phosphatase and Prostatic Specific Antigen (PSA) levels decline after treatment and rise with recurrence, PSA is the more sensitive marker for monitoring cancer progression and response to therapy. However, because serum PSA is moderately elevated in 30 to 50% of patients with benign prostatic hyperplasia (depending on prostate size and degree of obstruction) and in 25 to 92% of those with prostate cancer (depending on tumour volume), its role in early detection and staging is unclear. Significantly elevated PSA levels suggest extracapsular extension of tumour or metastases.
Prognosis and Treatment
Long-term local control—even cure—is possible. However, the potential for cure, even in patients with clinically localized cancer, depends on factors such as grade, stage, and pretreatment PSA level. For patients with low-grade, organ-confined tumours, survival is virtually identical to that for age-matched controls without prostate cancer.

Most patients elect to undergo definitive therapy with radical prostatectomy or radiotherapy. Radical prostatectomy is probably optimal for younger patients with longer life expectancy; they have the lowest risk of urinary incontinence. Radiotherapy may offer comparable results, especially in patients with low pretreatment PSA levels.

An asymptomatic patient with a locally advanced tumour or metastases may benefit from hormonal therapy with or without adjuvant radiotherapy. Hormonal therapy rarely uses exogenous estrogens, which pose an increased risk of cardiovascular and thromboembolic complications.

Medical Certification
Cancer of the prostate has a generally good prognosis, and tends to metastasise locally or to bone. Once primary treatment has been completed, certification will be possible where:
- There is no evidence of metastatic spread
- PSA has returned to normal
- There are no significant consequences of treatment, such as incontinence.

Should there be metastatic spread which has been controlled and PSA has returned to less than 10, certification will also be considered. Certification will be for no more than 12 months. Each CASA medical examination and report must be accompanied by a progress report from a urologist or oncologist, and a recent PSA level. If the applicant shows no signs of recurrence after three years from initial diagnosis, no further follow-up is required. Where there is metastatic spread surveillance will likely be lifelong. Provided no other medical conditions preclude it, there can be a return to regular certification procedures for age and Class.

Malignant Melanoma
Malignant melanoma is the second commonest malignancy in the Australian aircrew and ATC population. The incidence is rising. Sun exposure is a risk, as is family history and the occurrence of lentigo maligna, large congenital melanocytic naevus, and the dysplastic naevus syndrome.

About 40 to 50% of malignant melanomas develop from pigmented moles. Almost all of the rest arise from melanocytes in normal skin. Signs of malignant transformation should be carefully sought: change in size; change in colour, especially spread of red, white, and blue pigmentation to surrounding normal skin; change in surface characteristics, consistency, or shape; and signs of inflammation in surrounding skin, with possible bleeding, ulceration, itching, or pain.
Malignant melanomas vary in size, shape, and colour (usually pigmented) and in their propensity to invade and metastasize. This neoplasm may spread rapidly, causing death within months of its recognition, yet the 5-year cure rate of early, very superficial lesions is nearly 100%. Cure depends on early diagnosis and early treatment. The major types of malignant melanoma are:

- Lentigo maligna melanoma
- Superficial spreading melanoma: accounts for 2/3 of malignant melanomas
- Nodular melanoma: constitutes 10 to 15% of malignant melanomas.

**Prognosis and Treatment**

Two classification systems are useful for evaluating melanomas:

- Melanoma thickness as measured from the granular layer of the epidermis to the greatest depth of tumour invasion, as described by Breslow.
- Anatomic level of invasion, as described by Clark. In Clark's classification, level I is confined to epidermis; level II extends into papillary dermis; level III extends further into papillary dermis, with expansion of this layer; level IV extends into reticular dermis; and level V extends into subcutaneous fat.

Increased Breslow thickness and deeper invasion (Clark level) correlate with poorer prognosis. The clinical type of tumour is less important to survival than the thickness of the tumour at the time of diagnosis.

Metastatic spread of melanoma occurs both via lymphatics and blood vessels. Local spread results in formation of nearby satellite papules or nodules that may or may not be pigmented. Direct metastasis to skin or internal organs may occur, and occasionally metastatic nodules or enlarged lymph nodes are discovered before the primary lesion is identified. Melanomas arising from mucous membranes have a very poor prognosis, although they often seem quite limited when discovered.

Treatment is by surgical excision. Although the width of margins is debated, most experts agree that a 1-cm lateral tumour-free margin is adequate for lesions <1 mm thick. Thicker lesions may deserve more radical surgery and sentinel node biopsy.

Thick malignant melanomas and regional or distant metastasis may be treated with chemotherapy. Prognosis is poor.
Table 4: Five-year survival for malignant melanoma

<table>
<thead>
<tr>
<th>Tumour Thickness (mm) *</th>
<th>5-Year Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76</td>
<td>98 - 100</td>
</tr>
<tr>
<td>0.76 - 1.5</td>
<td>90 - 94</td>
</tr>
<tr>
<td>1.51 – 2.25</td>
<td>83 – 84</td>
</tr>
<tr>
<td>2.26 – 3.0</td>
<td>72 – 77</td>
</tr>
<tr>
<td>&gt; 3.0</td>
<td>46</td>
</tr>
</tbody>
</table>

* Tumour thickness is very difficult to assess if histological signs of regression are present.

Aeromedical Certification

Following diagnosis of a malignant melanoma, CASA will not certificate a pilot or ATC for the first 12 months because of the risk of spread to organs such as the brain, lungs or bone. The associated risk of incapacitation is significant. In some circumstances where the prognosis is extremely positive, certification prior to 12 months may be considered.

Class 1 and 3: In the absence of recurrence, CASA will usually approve Class 1 and 3 certification as follows:

Table 5: Post-malignant melanoma certification (Class 1 and 3)

<table>
<thead>
<tr>
<th>Tumour thickness</th>
<th>Certification</th>
<th>Period post-diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>0.76 – 1.49 mm</td>
<td>Multicrew</td>
<td>12 months</td>
</tr>
<tr>
<td>1.5 – 2.24 mm</td>
<td>Solo</td>
<td>24 months</td>
</tr>
<tr>
<td>2.25 – 3.0 mm</td>
<td>Multicrew</td>
<td>24 months</td>
</tr>
<tr>
<td>&gt; 3.0 mm</td>
<td>Multicrew</td>
<td>24 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>60 months</td>
</tr>
</tbody>
</table>
Class 2: In the absence of recurrence, CASA will usually approve Class 2 certification as follows:

Table 6: Post-malignant melanoma certification (Class 2)

<table>
<thead>
<tr>
<th>Tumour thickness</th>
<th>Certification</th>
<th>Period post-diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>0.76 – 1.49 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>1.5 – 2.24 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>2.25 – 3.0 mm</td>
<td>As or with co-pilot</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>24 months</td>
</tr>
<tr>
<td>&gt; 3.0 mm</td>
<td>As or with co-pilot</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>36 months</td>
</tr>
</tbody>
</table>

Certification will be for no more than 12 months, and renewal medical examinations and reports must be accompanied by a progress report from the treating dermatologist or oncologist. These reports will be required for at least 3 years following return to unrestricted duties.

Colorectal (Bowel) Cancer

In Western countries, cancers of the colon and rectum account for more new cases of cancer per year than cancer of any other anatomical site except the lung. Colorectal cancer is the most frequent cause of death from visceral malignancies that affect both sexes. The incidence of this condition begins to rise at age 40 and peaks at age 60 to 75 years. Colorectal cancer spreads by direct extension through the bowel wall, haematogenous metastasis, regional lymph node metastasis, perineural spread, and intraluminal metastasis.

Symptoms, Signs, and Diagnosis

Adenocarcinoma of the colon and rectum grows slowly, and a long interval elapses before it is large enough to produce symptoms. Early diagnosis depends on routine examination. Symptoms depend on the lesion's location, type, extent, and complications. In cancer of the rectum, the commonest presenting symptom is bleeding with defecation. Whenever rectal bleeding occurs, even with obvious haemorrhoids or known diverticular disease, coexisting cancer must be excluded. Simple, inexpensive testing of the stool for occult blood is advised as part of both screening and high-risk surveillance programs.

Elevated serum carcinoembryonic antigen (CEA) is not specifically associated with colorectal cancer, but levels are high in 70% of affected patients. If CEA is high preoperatively, and low after removal of a colon tumour, monitoring CEA may help to detect recurrence.
Treatment and Prognosis

Primary treatment consists of wide surgical resection of the colon cancer and regional lymphatic drainage. The choice of operation for rectal cancer depends on the tumour's distance from the anus and gross extent. Abdominoperineal resection of the rectum requires a permanent sigmoid colostomy. Surgical cure is possible in 70% of patients. The best 5-yr survival rate for cancer limited to the mucosa approaches 90% (stage I, Dukes’ A); with penetration of the muscularis propria, 80% (stage II, Dukes’ B); with positive lymph nodes, 30% (stage III, Dukes’ C).

Medical Certification

Issues dealing with colostomy and ileostomy are found in Section 2.9 Gastroenterology.

Following diagnosis of a bowel cancer, CASA will not usually certificate a pilot or ATC for the first 12 months because of the risk of spread to organs such as the brain, lungs or bone and the associated risk of incapacitation is significant. CASA will require the following information when considering the fitness of a pilot or ATC to return to aviation-related duties following the diagnosis of colorectal cancer: an annual report from the treating gastroenterologist and/or oncologist, including tissue diagnosis, staging and CEA level, for at least 5 years post-diagnosis.

In the absence of recurrence, CASA will usually approve certification as follows:

### Stage I

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>6 months</td>
</tr>
<tr>
<td>Solo</td>
<td>24 months</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solo</td>
</tr>
</tbody>
</table>

### Stage II

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>12 months</td>
</tr>
<tr>
<td>Solo</td>
<td>36 months</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solo</td>
</tr>
</tbody>
</table>
2.14 Malignancy

### Stage III

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>24 months</td>
</tr>
<tr>
<td>Solo</td>
<td>648 months</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot</td>
</tr>
<tr>
<td>Solo</td>
</tr>
</tbody>
</table>

#### Non-Hodgkin’s Lymphoma

Non-Hodgkin’s Lymphoma is a malignant monoclonal proliferation of lymphoid cells in sites within the immune system, including lymph nodes, bone marrow, spleen, liver, and gastrointestinal tract. Pathological classification of non-Hodgkin’s lymphomas (NHL) is evolving, reflecting new insights into the cells of origin and the biological bases of these heterogeneous diseases. The course of NHL varies from indolent and initially well tolerated to rapidly fatal.

#### Incidence and Aetiology

NHL occurs more often than Hodgkin’s disease. Its cause is unknown, although, as with the leukaemias, substantial experimental evidence suggests a viral cause for some lymphomas. Primary CNS involvement and disseminated disease occur. In about 30% of cases, the lymphomas are preceded by generalized lymphadenopathy.

#### Pathology

The Working Formulation classifies NHL into prognostic categories having therapeutic implications as follows:

- **Low-grade lymphomas** (38%): Diffuse, small lymphocytic; follicular, small-cleaved cell; follicular mixed, small and large cell.
- **Intermediate-grade lymphomas** (40%): Follicular large cell; diffuse, small-cleaved cell; diffuse mixed, small and large cell; diffuse large cell.
- **High-grade lymphomas** (20%): Immunoblastic lymphoma; lymphoblastic lymphoma; small non-cleaved cell lymphoma (Burkitt's and non-Burkitt's types).
- **Miscellaneous lymphomas** (2%): Composite lymphomas; mycosis fungoides; true histiocytic; other, and unclassifiable types.
Symptoms and Signs

Although various clinical manifestations of NHL occur, many patients present with asymptomatic peripheral lymphadenopathy. Enlarged lymph nodes are rubbery and discrete and later become matted. Local disease is apparent in some patients, but most have multiple areas of involvement. Anaemia is initially present in about 33% of patients and eventually develops in most.

Staging

Localised NHL does occur, but the disease is disseminated when first recognized in about 90% of follicular lymphomas and 70% of diffuse lymphomas. The final staging of NHL is similar to that of Hodgkin's disease; however, it is more often based on clinical than pathological findings.

Table 7: Ann Arbor Staging of Hodgkin's Disease and Non-Hodgkin's Lymphoma

<table>
<thead>
<tr>
<th>Stage *</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>In one lymph node only</td>
</tr>
<tr>
<td>II</td>
<td>In two or more lymph nodes on the same side of the diaphragm</td>
</tr>
<tr>
<td>III</td>
<td>In the lymph nodes, spleen, or both and on both sides of the diaphragm</td>
</tr>
<tr>
<td></td>
<td>1 Above the renal vessels (eg, spleen; splenic, hilar, coeliac and portal nodes)</td>
</tr>
<tr>
<td></td>
<td>2 In the lower abdomen (periaortic, pelvic, or inguinal nodes)</td>
</tr>
<tr>
<td>IV</td>
<td>Extranodal involvement (eg, bone marrow, lung, liver)</td>
</tr>
</tbody>
</table>

*Subclassification E indicates extranodal involvement adjacent to an involved lymph node (eg, disease of mediastinal nodes and hilar adenopathy with adjacent lung infiltration is classified as stage II E). Stages can be further classified by A to indicate the absence; or B to indicate the presence of constitutional symptoms (weight loss, fever, or night sweats). B symptoms generally occur with stages III and IV (20 to 30% of patients).

Initially, constitutional symptoms tend to be less common in NHL than in Hodgkin's disease and do not usually alter prognosis. Organ infiltration is more widespread in NHL, and the bone marrow and peripheral blood may be involved.

Prognosis and Treatment

The histopathology, stage of disease, and results of surface marker studies significantly influence the prognosis and response to treatment. Patients with T-cell lymphomas generally have a worse prognosis than those with B-cell types. Other factors that adversely affect prognosis are poor performance status, age >60 years, elevated LDH level, bulky tumour masses (diameter >10 cm), and more than two extranodal sites of disease.

A prognostic index for diffuse mixed, diffuse large cell, and immunoblastic lymphomas has been reported. The International Prognostic Index (IPI) considers five categories: age, performance status, LDH level, number of extranodal sites, and stage. Prognostic groups of low, low intermediate, high intermediate, and high risk may be defined.
Table 8: Outcome According to Risk Group as Defined by the International Prognostic Index

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Risk Factors (n)</th>
<th>Patients * (%)</th>
<th>Complete Response (%)</th>
<th>2-Yr Relapse-Free Survival (%)</th>
<th>5-Yr Relapse-Free Survival (%)</th>
<th>2-Yr Survival (%)</th>
<th>5-Yr Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>0 or 1</td>
<td>35</td>
<td>87</td>
<td>79</td>
<td>67</td>
<td>72</td>
<td>56</td>
</tr>
<tr>
<td>Low - intermediate</td>
<td>2</td>
<td>27</td>
<td>67</td>
<td>66</td>
<td>50</td>
<td>64</td>
<td>51</td>
</tr>
<tr>
<td>High - intermediate</td>
<td>3</td>
<td>22</td>
<td>55</td>
<td>59</td>
<td>49</td>
<td>53</td>
<td>43</td>
</tr>
<tr>
<td>High</td>
<td>4 or 5</td>
<td>16</td>
<td>44</td>
<td>44</td>
<td>40</td>
<td>34</td>
<td>26</td>
</tr>
</tbody>
</table>


A cure may be expected in 30 to 50% of affected patients with intermediate- and high-grade lymphomas undergoing myeloablative therapy. In low-grade lymphomas, it remains uncertain whether cure may be obtained with transplantation, although their survival rate is better than that of patients receiving secondary palliative therapy alone.

Medical Certification

Without a complete remission, return to aviation duties will not usually be considered. Once in remission, certification will usually be conducted on a case-by-case basis, using Table 9 (see next page) as a guide. The high rate of late recurrence limits the likelihood of an unrestricted Class 1 or Class 3 certification.

Table 9: Post-remission certification

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Class 1 &amp; 3 solo</th>
<th>Class 1 &amp; 3 multi-crew/no solo controlling</th>
<th>Class 2 solo</th>
<th>Class 2 as or with co-pilot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>4 years</td>
<td>2 years</td>
<td>2 years</td>
<td>1 year</td>
</tr>
<tr>
<td>Low - intermediate</td>
<td>5 years</td>
<td>2 years</td>
<td>3 years</td>
<td>1 year</td>
</tr>
<tr>
<td>High - intermediate</td>
<td>Certification unlikely</td>
<td>2 years</td>
<td>4 years</td>
<td>2 years</td>
</tr>
<tr>
<td>High</td>
<td>Certification unlikely</td>
<td>2 years</td>
<td>5 years</td>
<td>3 years</td>
</tr>
</tbody>
</table>

Timing is after a complete remission has been obtained.

Applications for renewal of a medical certificate must be accompanied by a progress report from the treating haematologist or oncologists detailing treatment, prognosis and current health. Certification will be for a maximum of 12 months until at least 5 years post-re-certification, and at least 3 years following return to unrestricted duties.
**Hodgkin’s Disease**

Hodgkin’s Disease is a localised or disseminated malignant proliferation of tumour cells arising from the lymphoreticular system, primarily involving lymph node tissue and bone marrow.

**Incidence and Aetiology**

Hodgkin’s disease has a bimodal age distribution that peaks at ages 15 to 34 and after age 60. However, the second peak may be an artefact of inaccurate diagnosis, because most cases diagnosed after age 60 are intermediate-grade non-Hodgkin’s lymphomas.

**Pathology**

Diagnosis depends on identification of Reed-Sternberg cells (large binucleated cells) in lymph nodes or at other sites.

*Table 10: Histopathological Subtypes of Hodgkin’s Disease*

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance</th>
<th>Incidence</th>
<th>Progression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lymphocyte predominant</td>
<td>Few Reed-Sternberg cells and many lymphocytes</td>
<td>3%</td>
<td>Relatively slow or indolent</td>
</tr>
<tr>
<td>Nodular sclerosis</td>
<td>Dense fibrous tissue surrounds nodules of Hodgkin's tissue</td>
<td>67%</td>
<td>Intermediate or moderately progressive; relatively slow or indolent (occasionally)</td>
</tr>
<tr>
<td>Mixed cellularity</td>
<td>A moderate number of Reed-Sternberg cells with a mixed background infiltrate</td>
<td>25%</td>
<td>Intermediate or moderately progressive; aggressive</td>
</tr>
<tr>
<td>Lymphocyte-depleted</td>
<td>Numerous Reed-Sternberg cells and extensive fibrosis</td>
<td>5%</td>
<td>Aggressive</td>
</tr>
</tbody>
</table>

**Symptoms and Signs**

Symptoms and signs primarily relate to the site, amount, and extent of nodal mass involvement. Most patients present with cervical and mediastinal adenopathy and without systemic complaints. Other manifestations develop as the disease spreads through the reticuloendothelial system, generally among contiguous sites. The rate of progression varies according to histopathological subtype.

**Diagnosis**

Hodgkin's disease can be definitively diagnosed by lymph node biopsy that reveals Reed-Sternberg cells in a characteristic histological setting. Hodgkin's disease may be difficult to differentiate from lymphadenopathy caused by infectious mononucleosis, toxoplasmosis, cytomegalovirus, NHL, or leukaemia.
Staging

Radiotherapy, chemotherapy, or a combination of both is potentially curative, but the extent or stage of disease must first be determined. The Ann Arbor staging system (see Non-Hodgkin’s Lymphoma) is commonly used.

Treatment

Chemotherapy or radiotherapy regimens cure most patients.

- **Stage I and IIA disease** can be treated with radiotherapy. Such treatment cures about 80% of patients. Cure refers to being disease-free at 5 years post-therapy, after which relapse is very rare.

- For **stage IIIA1 disease**, total nodal irradiation results in an overall survival of 85 to 90%, with disease-free survival of 65 to 75% at 5 years.

- For **stage IIIA2 disease**, combination chemotherapy is generally used with or without radiotherapy of bulky nodal sites. Cure rates of 75 to 80% have been achieved.

- Because radiotherapy alone does not cure **stage IIIB disease**, combination chemotherapy alone or in conjunction with radiotherapy is required. Survival ranges from 70 to 80% (at 5 years).

- For **stage IVA and B disease**, combination chemotherapy has produced a complete remission in 70 to 80% of patients, with >50% remaining disease-free at 10 to 15 years. Patients who fail to achieve complete remission or who relapse within 6 to 12 months have a poor prognosis.

Medical Certification

CASA will not usually consider certification until at least 12 months following successful treatment. “Successful treatment” requires that the disease be in complete remission. Table 11 (below) provides guidance on the likely time before CASA will consider certification, assuming that there are no other significant health issues, no side effects from the treatment and ongoing complete remission or “cure” has been effected. All renewal medical examinations and reports must be accompanied by a progress report from the treating haematologist or oncologist.

**Table 11: Likely certification timings**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Class 1 &amp; 3 solo</th>
<th>Class 1 &amp; 3 multi-crew/no solo controlling</th>
<th>Class 2 solo</th>
<th>Class 2 as or with co-pilot</th>
</tr>
</thead>
<tbody>
<tr>
<td>I and IIA</td>
<td>1 year</td>
<td>6 months</td>
<td>1 year</td>
<td>6 months</td>
</tr>
<tr>
<td>IIIA1</td>
<td>2 years</td>
<td>1 year</td>
<td>2 years</td>
<td>6 months</td>
</tr>
<tr>
<td>IIIA2</td>
<td>3 years</td>
<td>2 years</td>
<td>2 years</td>
<td>1 year</td>
</tr>
<tr>
<td>IIIB and IV</td>
<td>4 years</td>
<td>2 years</td>
<td>3 years</td>
<td>1 year</td>
</tr>
</tbody>
</table>
Testicular Cancer

Testicular tumours account for most solid tumours in males aged less than 30 years. Malignant testicular tumours arise from the primordial germ cell and differentiate to reveal seminoma, teratoma, embryonal carcinoma, endodermal sinus tumour (yolk sac tumour), and choriocarcinoma.

Symptoms, Signs, and Diagnosis

The usual presenting sign is a scrotal mass, sometimes associated with pain. Many patients discover the mass in association with minor trauma. Haemorrhage into the tumour may produce local pain and tenderness. Any firm mass in the testis is cause for immediate clinical suspicion of testicular tumour. Diagnostic studies should include radioimmunoassays for α-fetoprotein and β-human chorionic gonadotropin. These markers, when elevated, indicate the presence of tumour; they are also valuable in follow-up of patients with proven testicular tumours, especially the non-seminomatous types.

Prognosis and Treatment

Prognosis depends on the histology and extent of the tumour. Survival rates are >95% at 5 years for seminomas and non-seminomas localized to the testis or low-volume metastases in the retroperitoneum. The 5-year survival rate for extensive retroperitoneal metastases or pulmonary or other visceral metastases is poorer and varies with site, volume, and histology of the metastases.

Radical (inguinal) orchidectomy, the cornerstone of treatment, provides important histopathological information for planning further therapy. These parameters can accurately predict the risk of occult lymph node metastases; so low-risk patients with normal x-rays and biomarkers may be candidates for surveillance protocols, especially patients with non-seminomatous germ cell tumours rather than seminomas. Otherwise, standard treatment for seminoma is irradiation after unilateral orchidectomy. For non-seminomatous germ cell tumours, standard treatment is retroperitoneal lymph node dissection.

Medical Certification

Stage 1 (non-metastatic disease):

- Teratoma with orchidectomy only. Following recovery from the surgery, unrestricted Class 1, 2 or 3 is usual. For the first 24 months, certification is for 6 months at a time. Each medical is to be accompanied by a report from urologist or oncologist, along with tumour marker levels. Tumour markers will usually rise before any anatomical disease is identifiable. After two years without recurrence, this can increase to 12 monthly certification, until 5 years post-diagnosis.
2.14 Malignancy

- **Seminoma with orchidectomy only.** There is a 15% relapse rate. This is usually monitored by serial CT or MRI scans. Unrestricted Class 1 or 3 certification will be delayed for 24 months post-surgery. Restricted Class 1 and 3 and unrestricted Class 2 is possible from recovery after surgery. Certification will be for 6 months for the first two years, then annual until 5 years post-diagnosis.

- **Seminoma with orchidectomy and radiotherapy.** As the cure rate is greater than 99%, unrestricted Class 1, 2 and 3 certification is possible as soon as the individual has recovered from the primary treatment. Certification again will be for 6 months for the first 2 years, then annual, and the medical must be accompanied by a progress report from the treating urologist or oncologist.

**Stage II/III (local metastatic disease):** The prognosis remains good compared with most other malignancies.

<table>
<thead>
<tr>
<th>Class</th>
<th>Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/3 multi-crew/no solo controlling</td>
<td>Following recovery from primary treatment and disease free</td>
</tr>
<tr>
<td>1/3 solo</td>
<td>12 months following successful treatment</td>
</tr>
<tr>
<td>2 as or with co-pilot</td>
<td>Following recovery from primary treatment and disease free</td>
</tr>
<tr>
<td>2 solo</td>
<td>6 months following successful treatment</td>
</tr>
</tbody>
</table>

Renewal medical examinations and reports must be accompanied by a progress report from the treating specialist.

**Stage IV (disseminated disease):** Although 5-year survival is around 60-70%, this outcome is usually achieved only by prolonged chemotherapy. While chemotherapy is required, there will be no certification.

<table>
<thead>
<tr>
<th>Class</th>
<th>Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/3 multi-crew/no solo controlling</td>
<td>24 months following successful treatment</td>
</tr>
<tr>
<td>1/3 solo</td>
<td>Certification unlikely</td>
</tr>
<tr>
<td>2 as or with co-pilot</td>
<td>12 months after last treatment and continued disease free</td>
</tr>
<tr>
<td>2 solo</td>
<td>24 months following successful treatment</td>
</tr>
</tbody>
</table>

Renewal medical examinations and reports must be accompanied by a progress report from the treating specialist.

**Other Malignancies**

This section is not intended to provide detailed advice for all possible malignancies. Other malignancies may be discussed in the relevant organ system section of this Handbook. Otherwise, the guiding principles outlined above should be used. Where doubt exists, discussion with, or referral to, CASA Aviation Medicine Section should be undertaken immediately.
Designated Aviation Medical Examiner's Handbook

2. Medical Aspects
2.15 Differences between Australian Medical Certification and ICAO Medical Certification for International Operations

Approved by Assistant Director, Aviation Safety Standards   Version 3.0: December 2003

2.15.1 Currency of Medical Certification

ICAO commences periods of currency from the date of the medical examination, not from the date of CASA's assessment nor from the applicant's anniversary date. As an aide-memoire to applicants, CASA's medical certificates record the date on which the applicant's most recent medical examination was performed, to assist calculation of the medical certificate's currency for ICAO purposes. (See the Note below.)

2.15.2 Duration of Medical Certification

Class 1 medical certificates

For applicants with ATPL who are aged 40 years or more, ICAO demands a medical examination by a DAME every six months. That is, the currency of medical certification for this group extends for only six months from the date of the most recent medical examination.

Class 2 medical certificates

ICAO demands a medical examination by a DAME every two years for all Class 2 medical certificate holders. That is, the currency of medical certification for this group extends for only two years from the date of the most recent medical examination.

As an aide-memoire to applicants, CASA's medical certificates record the date on which the applicant's most recent medical examination was performed, to assist calculation of the medical certificate's currency for ICAO purposes. (See the Note below.)

Note: This has no effect on the notified currency of medical certificates when exercising licence privileges within Australian airspace.

This advice is provided to all Class 1 or Class 2 medical certificate holders whenever a CASA medical certificate is issued.
2. Medical Aspects
2.15 Differences between Australian Medical Certification and ICAO Medical Certification for International Operations

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3.1.1 Questions to be Asked of CASA Employees for Superannuation Medicals

The following are questions to be asked during Superannuation Medicals (Class 3 Medical Certificate holders and pilots to be employed by CASA).

1. Have you ever been rejected:
   a. As a risk for life insurance?
   b. For admission to any employment for health reasons?
   c. For entry into any superannuation scheme?

2. Have you ever been retired or have your services ever been terminated from any employment on medical or invalidity grounds?

3. Are you receiving, or have you ever received:
   a. A pension or any other benefit from the Commonwealth Superannuation Scheme, the Defence Force Retirement and Death Benefits Scheme, or any other government or private superannuation scheme?
   b. Workers’ or employees’ compensation?
   c. A Social Security invalidity pension or sickness benefit?
   d. A Repatriation service pension?
   e. A Repatriation disability pension? If so, please state award rate.
## 4. Aviation Medicine Telephone Numbers and Addresses

### 4.1 Telephone List

#### 4.1.1 Aviation Medicine Telephone Contact as at December 2000

<table>
<thead>
<tr>
<th>CASA National Office (at the cost of a local telephone call)</th>
<th>131 757</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inquiries</td>
<td>(02) 6217 1641</td>
</tr>
<tr>
<td>Facsimile</td>
<td>(02) 6217 1640</td>
</tr>
</tbody>
</table>
4.2 CASA Offices

4.2.1 Head Office

Aviation Medicine Section
Cnr Barry Drive & Northbourne Avenue
CANBERRA ACT 2601
GPO Box 1544
CANBERRA CITY ACT 2601

4.2.2 Area Offices

<table>
<thead>
<tr>
<th>Office</th>
<th>Address</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney Basin</td>
<td>PO Box CPS Condell Park NSW 2200</td>
<td>(02) 97803050</td>
</tr>
<tr>
<td>NT and Kimberleys</td>
<td>PO Box 41196 Casuarina NT 0811</td>
<td>(08) 89432999</td>
</tr>
<tr>
<td>South Queensland</td>
<td>39 Navigator Place Hendra Qld 4051</td>
<td>(07) 3632 4051</td>
</tr>
<tr>
<td>North Queensland</td>
<td>PO Box 7740 Garbutt Qld 4814</td>
<td>(07) 4750 2671</td>
</tr>
<tr>
<td>NSW Country Office</td>
<td>GPO Box 2005 Canberra ACT 2601</td>
<td>131757</td>
</tr>
<tr>
<td>Victoria Tasmania</td>
<td>PO Box 20 Moorabbin VIC 3189</td>
<td>131757</td>
</tr>
<tr>
<td>Central</td>
<td>PO Box 126 PBC Adelaide SA 5950</td>
<td>(08) 8422 2904</td>
</tr>
<tr>
<td>West Australia</td>
<td>GPO Box 1082 CLOVERDALE WA 6105</td>
<td></td>
</tr>
</tbody>
</table>
## 5.1 Locations for Colour Vision Testing

### 5.1.1 Locations by State

| Australian Capital Territory | 1. **Dr D Batagol**  
Ainslie Family Practice  
21 Edgar St  
AINSLIE ACT 2602  
Tel: (02) 6249 7177 |
|-----------------------------|--------------------------------------------------|
| New South Wales             | 1. **School of Optometry**  
(Paula Katalinic) Rupert Meyers Blg  
University of New South Wales  
KENSINGTON NSW 2033  
Tel: (02) 9385 4624  
2. **Dr P Duke**  
135 Macquarie Street  
SYDNEY NSW 2000  
Tel: (02) 9247 3557 |
| Northern Territory          | 1. **Dr M I Mahmood**  
Darwin Private Hospital  
Rocklands Drive  
CASUARINA NT 0810  
Tel: (08) 8920 6049 |
| Queensland                  | 1. **Optometry Clinic, School Of Optometry**  
O Block Kelvin Grove Campus  
Victoria Park Road  
KELVIN GROVE QLD 4059  
Tel: (07) 3864 5739  
**Note:**  
Please specify "Aviation Colour Vision Test" when making an appointment.  
2. **Dr W Talbot**  
14 Fulham Rd  
PIMLICO TOWNSVILLE QLD 4812  
Tel: (07) 4775 1633 |
### 5. Colour Vision Testing

#### 5.1 Locations for Colour Vision Testing

<table>
<thead>
<tr>
<th>Location</th>
<th>1.</th>
<th>2.</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Australia</td>
<td><strong>Dr J L Crompton</strong>&lt;br&gt;22 Walter Street&lt;br&gt;NORTH ADELAIDE SA 5006&lt;br&gt;Tel: (08) 8267 3211</td>
<td><strong>Dr J Parkes</strong>&lt;br&gt;54 Station Place&lt;br&gt;SUNSHINE VIC 3020&lt;br&gt;Tel: (03) 9312 0800</td>
</tr>
<tr>
<td>Tasmania</td>
<td><strong>Defence Forces</strong>&lt;br&gt;Recruiting Medical Section&lt;br&gt;Anglesea Barracks, Davie Street&lt;br&gt;HOBART TAS 7000&lt;br&gt;Tel: (03) 6237 7327</td>
<td><strong>Ms Lisa Biggs</strong>&lt;br&gt;Suite G108, First Floor&lt;br&gt;Northcourt Building&lt;br&gt;200 Karrinyup Rd&lt;br&gt;KARRINYUP WA 6018&lt;br&gt;Tel: 0411 617 808</td>
</tr>
<tr>
<td>Victoria</td>
<td><strong>Visual Functions Clinic</strong>&lt;br&gt;Victorian College of Optometry&lt;br&gt;Cornor Keppel and Cardigan Streets&lt;br&gt;CARLTON VIC 3053&lt;br&gt;Tel: (03) 9349 7400</td>
<td><strong>Abernathy Owens Optometrists</strong>&lt;br&gt;888 Hay St&lt;br&gt;PERTH WA&lt;br&gt;Tel: (08) 9486 8855</td>
</tr>
</tbody>
</table>

**Note:** Please state that an “Aviation Colour Vision Test” is required in the Visual Functions Clinic when making an appointment.
6.1.1 List of Forms

<table>
<thead>
<tr>
<th>Former Form No.</th>
<th>New CASA Form No.</th>
<th>Title</th>
<th>Available From</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVM 010</td>
<td>093</td>
<td>Authority Audiogram</td>
<td>J.S. McMillan</td>
</tr>
<tr>
<td>AVM 011</td>
<td>094</td>
<td>ECG</td>
<td>Phone: 02 9795 1222 (Australia) +61 2 9795 1222 (International)</td>
</tr>
<tr>
<td>AVM 006</td>
<td>097</td>
<td>Medical Questionnaire and Examination Form—R</td>
<td>P.O Box 136 Regents Park NSW 2143</td>
</tr>
<tr>
<td>AVM 012</td>
<td>098</td>
<td>Medical Questionnaire and Examination Form—O</td>
<td></td>
</tr>
<tr>
<td>AVM 007</td>
<td>099</td>
<td>Eye Examination Report—V</td>
<td></td>
</tr>
<tr>
<td>AVM 005</td>
<td>172</td>
<td>Medical Certificate</td>
<td>Aviation Medicine Section, Canberra</td>
</tr>
<tr>
<td>AVM 008</td>
<td>755</td>
<td>Application for Appointment or Re-appointment as Designated Aviation Medical Examiner or Designated Aviation Ophthalmologist (under Regulation 6.02 of the Civil Aviation Regulations)</td>
<td>The CASA website</td>
</tr>
</tbody>
</table>
Blank page
BODY MASS INDEX CHART

Weight For Height Chart
(For Men and Women from 18 years onward)

Based on Body Mass Index (BMI) in Range of 18, 20, 25, 30.

\[
\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}
\]
PEAK EXPIRATORY FLOW IN NORMAL SUBJECTS


MEN

WOMEN

IN MEN, VALUES OF PEF UP TO 150 LITRES/MIN LIE BETWEEN PREDICTED, AND IN WOMEN LESS THAN 55 LITRES/MIN LIE LESS THAN PREDICTED, ARE WITHIN NORMAL LIMITS.
1. Revision History
Coronary Heart Disease

Risk Factor Prediction Chart

1. Find Points for each Risk Factor

<table>
<thead>
<tr>
<th>Age (if Female)</th>
<th>Age (if Male)</th>
<th>HDL Cholesterol</th>
<th>Total Cholesterol</th>
<th>Systolic Blood Press</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pts Age</td>
<td>Pts Age</td>
<td>Pts Age</td>
<td>Pts HDL-C Total-C</td>
<td>Pts SPB</td>
</tr>
<tr>
<td>30</td>
<td>-12</td>
<td>47-48</td>
<td>5 30 -2</td>
<td>57-59 13</td>
<td>0.65-0.68</td>
</tr>
<tr>
<td>31</td>
<td>-11</td>
<td>49-50</td>
<td>6 31 -1</td>
<td>60-61 14</td>
<td>0.69-0.76</td>
</tr>
<tr>
<td>32</td>
<td>-9</td>
<td>51-52</td>
<td>7 32-33 0</td>
<td>62-64 15</td>
<td>0.77-0.84</td>
</tr>
<tr>
<td>33</td>
<td>-8</td>
<td>53-55</td>
<td>8 34 1</td>
<td>65-67 16</td>
<td>0.85-0.90</td>
</tr>
<tr>
<td>34</td>
<td>-6</td>
<td>56-60</td>
<td>9 35-36 2</td>
<td>68-70 17</td>
<td>0.91-0.99</td>
</tr>
<tr>
<td>35</td>
<td>-5</td>
<td>61-67</td>
<td>10 37-38 3</td>
<td>71-73 18</td>
<td>1.00-1.09</td>
</tr>
<tr>
<td>36</td>
<td>-4</td>
<td>68-74</td>
<td>11 39 4</td>
<td>74 19</td>
<td>1.10-1.19</td>
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<tr>
<td>37</td>
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<td>40-41</td>
<td>5 41-42</td>
<td>6</td>
<td>1.20-1.30</td>
</tr>
<tr>
<td>38</td>
<td>-2</td>
<td>42-43</td>
<td>6 43-44</td>
<td>7</td>
<td>1.31-1.43</td>
</tr>
<tr>
<td>39</td>
<td>-1</td>
<td>44-45</td>
<td>7 45-46</td>
<td>8</td>
<td>1.44-1.56</td>
</tr>
<tr>
<td>40</td>
<td>0</td>
<td>46-47</td>
<td>8 47-48</td>
<td>9</td>
<td>1.57-1.70</td>
</tr>
<tr>
<td>41</td>
<td>1</td>
<td>48-49</td>
<td>9 49-50</td>
<td>10</td>
<td>1.71-1.89</td>
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<td>42-43</td>
<td>2</td>
<td>50-51</td>
<td>10</td>
<td></td>
<td>1.90-2.07</td>
</tr>
<tr>
<td>44</td>
<td>3</td>
<td>52-54</td>
<td>11</td>
<td></td>
<td>2.08-2.25</td>
</tr>
<tr>
<td>45-46</td>
<td>4</td>
<td>55-56</td>
<td>12</td>
<td></td>
<td>2.26-2.49</td>
</tr>
</tbody>
</table>

2. Sum Points for all Risk Factors

Age ( ) + (HDL-C ( ) = Total-C ( ) + SBP ( ) + Smoker ( ) + Diabetes ( ) + ECG-LVH ( ) Point Total

NOTE: Minus points subtract from total

3. Look up risk corresponding to point total

<table>
<thead>
<tr>
<th>Probability (%)</th>
<th>Probability (%)</th>
<th>Probability (%)</th>
<th>Probability (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pts 5yrs 10yrs</td>
<td>Pts 5yrs 10yrs</td>
<td>Pts 5yrs 10yrs</td>
<td>Pts 5yrs 10yrs</td>
</tr>
<tr>
<td>&lt;1 &lt;1 &lt;2 &lt;2</td>
<td>10 2 6 6</td>
<td>19 8 16 16</td>
<td>28 19 33 33</td>
</tr>
<tr>
<td>2 1 2</td>
<td>11 3 6 6</td>
<td>20 8 18 18</td>
<td>29 20 36 36</td>
</tr>
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<td>3 1 2</td>
<td>12 3 7 7</td>
<td>21 9 19 19</td>
<td>30 22 38 38</td>
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<td>4 1 2</td>
<td>13 3 8 8</td>
<td>22 11 21 21</td>
<td>31 24 40 40</td>
</tr>
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<td>5 1 3</td>
<td>14 4 9 9</td>
<td>23 12 23 23</td>
<td>32 25 42 42</td>
</tr>
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<td>6 1 3</td>
<td>15 5 10 10</td>
<td>24 13 25 25</td>
<td>55 12 16 16</td>
</tr>
<tr>
<td>7 1 4</td>
<td>16 5 12 12</td>
<td>25 14 27 27</td>
<td>60 13 21 21</td>
</tr>
<tr>
<td>8 2 4</td>
<td>17 6 13 13</td>
<td>26 16 29 29</td>
<td>65 9 30 30</td>
</tr>
<tr>
<td>9 2 5</td>
<td>18 7 14 14</td>
<td>27 17 31 31</td>
<td>70 12 24 24</td>
</tr>
</tbody>
</table>

Modified from Chart by the American Heart Association, April 2002
1. Revision History
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

Published by permission of Dr. D.R. Jones from ‘Psychiatric Factors in Civil Aviation Medicine’. David R. Jones, MD, MPH. 10 January 2001. This is extracted from material provided by the FAA’s Civil Aviation Medicine Institute to its Basic Aviation Medical Examiner Course.

1. Clues that may be available before the examination begins:
   - You may know something of the reputation of the applicant in the community.
   - You may learn something from the applicant’s interaction with your office staff.

   Applicants with mental health problems may behave differently with office staff than with the examiner. Consider this if your staff points out behavioural problems or eccentricities.

2. Clues on Medical Certification form:
   - The applicant’s form contains careless or missing marks.

   Obtain the correct or missing data and ask why the mistake was made.
   - The class of certificate desired is not usual for this type of pilot.

   Find out how flying fits into the applicant’s lifestyle and plans.
   - The applicant does not live or work locally.

   Consider the type and stability of the applicant’s occupation.
   - Previous examinations were not completed.

   Was the applicant learning what to say or not say in order to pass?
   - Previous problems prevented certification (medical or mental health history).
   - Previous experience with health professionals was not adequately explained.
   - Pilot has had personal counselling by mental health professionals or paraprofessionals.
   - Pilot time is unusual or contains unexplained gaps.

   Ask for explanation from a high-time pilot with no date of last examination.
   - Medication history suggests significant illnesses that pilot did not note on the history questionnaire.

   Obtain an adequate history.
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

- Explanations for any medical history or findings do not make sense or seem illogical.

  *Remember Jones’s Rule of Irrational Data:* If you don’t understand what a flier means, assume it’s your problem. Ask again, clearly. If the flier tries hard to explain, you try hard to understand, and you still don’t understand, it’s probably the flier’s problem. Find out what it is. Possibilities include simple misunderstandings, English as a second language, educational deficiencies, cultural differences, limited intelligence, neurological problems, or psychiatric problems.

3. **Clues obtained during the physical examination:**

- Note anything markedly different from what you usually see in pilots: trust your instincts.

- Assess the nature of the applicant’s motivation to fly (Jones, 1986). Err on the side of caution.

  *Watch for applicants who want to be fliers rather than who want to fly.* Some see themselves as alienated from others, or inept, or weak, and wish to acquire the attributes they perceive to be those of fliers: gregarious, competent, and strong.

  *Watch for applicants who want to fly in order to prove fearlessness.*

- Look for scars without explanation obtained by history. Palpate scalp and skull for evidence of old head injury.

  *Watch for applicants whose collection of scars reflects personal recklessness.*

- Watch for applicants who are evasive about surgical scars or head injury scars. Ask about significant loss of consciousness or amnesia if pilot did not report the injury on the 8500-8.

- Observe other pertinent physical factors bearing on mental status (e.g., dress, grooming conduct, alcohol on breath, needle tracks, tattoos that suggest sociopathy, slash scars on wrists, spider nevi, hepatomegaly, blood pressure, heart rate, pupils).

- Talk with applicants before, during, and after the physical examination—inquire about home, work, education, military, or flying. Trust your judgment if you feel uneasy.
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

- Inquire about non-prescription medications, herbal remedies and dietary supplements.

Such information may be aeromedically significant because of the nature of these remedies, or because of the symptoms for which the pilot feels they are necessary. Taking St. John’s Wort may indicate the presence of depressive symptoms, for instance.

4. What to do when you have finished:

- Ask enough questions to clarify troublesome issues.
- Obtain indicated medical data.
- If anything you encounter raises clinical questions about the applicant’s mental status, or even if you find yourself feeling uncomfortable without knowing exactly why, perform a brief mental status evaluation, using some or all of the items in the Formal Mental Status Examination (MSE) that follows.

Note that some clinical MSEs, such as the Mini-Mental Status Examination, assess only the Sensorium rather than the entire mental status of a person.

- If you find anything that indicates clinical problems, consider necessary specialty consultations. Again, trust your judgment as an examiner, even if you can’t exactly define what’s wrong.
- Mention equivocal items in “Comments” section of Original or Renewal form for the record, even if you grant the certificate. Your data will be on record if the item arises in future examinations.
- If in doubt, call CASA AVMED for advice.
- If in serious doubt, defer; let CASA decide.
- As a last resort: make a “Don’t quote me” call to the medical authority.
Formal Mental Status Examination

AMSIT (Appearance, Mood, Sensorium, Intelligence, Thought) is adapted from a formulation by David Fuller, MD, as presented in R.L. Leon, MD. Psychiatric Interviewing: A Primer. Ed 2, New York; Elsevier/Science Publishing Co. 1989.

Appearance, Behaviour, and Speech

- **Physical Appearance**: apparent age, sex, and other identifying features. Appearance of being physically ill or in distress; and a careful description of the patient’s dress and behaviour.
- **Manner of Relating to Examiner**: placating, negativistic, seductive; motivation to work with examiner.
- **Psychomotor Activity**: increased or decreased, including jumpiness, jiggling, tapping, looking at watch, etc. Is the person hyperactive or lethargic?
- **Behavioural Evidence of Emotion**: tremulousness, perspiration, tears, clinched fist, turned-down mouth wrinkled brow, etc.
- **Disturbance of Attention**: distractibility, self-absorption.
- **Speech**: description—volume, rate (pressured or slowed), clarity, spontaneity and disturbances—mutism, word salad, perseveration, echolalia, affectation, neologisms, clang speech.

Mood and Affect

**Note**: “Mood is to Affect as Climate is to Weather.”

- **Mood**: use adjectives: mild (it’s there), moderate (it needs treatment), or severe (it needs treatment today!). Consider depression, elation, or other sustained emotions such as anger, fear, or anxiety.
- **Affect**: its range, intensity, lability, and appropriateness to immediate thought. To describe a normal, stable emotional status, say something like “The examinee’s mood is euthymic. Affect is unremarkable in range, intensity, and stability, and is appropriate to material being discussed.”

Sensorium

- **Orientation**: for time, place and situation.
- **Memory**: immediate (digits recall), recent (three items for 10 minutes, current events) and remote (history).
Formal Mental Status Examination

- **Calculating Ability**: serial 7’s, 11 times 13 out loud (valid only if patient is adequately educated).

- **Concentration**: spell WORLD backwards, then arrange its letters alphabetically. Repeat with EARTH.

**Intellectual Function**

Estimate current level of function as **above average**, **average**, or **below average** based on general fund of information, vocabulary, and complexity of concepts. Do not confuse **intelligence** with **education**. Can the examinee handle abstract ideas, reason by analogy, “make the connection” in conversation? Is the examinee about as smart as the examiner?

**Thought**

- **Coherence**: clear thoughts may be expressed incoherently.

- **Logic**: even clear, grammatical speech may express illogical thoughts.

- **Goal Directedness** (has a point and makes it): tangential or circumstantial thought.

- **Disturbance of Attention**: distractibility (interrupts own sentences), self-absorption.

- **Associations**: loose associations, blocking of obvious ideas or connections, flight of ideas.

- **Perceptions**: hallucinations (false perceptions), illusions, depersonalisation, distortion of body image.

- **Delusions**: false interpretations of real situations.

- **Other Content**: noteworthy memories, thoughts and feelings; suicidal or homicidal intent.

- **Judgement**: formal (specific set-piece situations such as “mailing a letter you find on the street”), social (how examinee behaves with examiner, how he or she “reads” other people—predictable, reasonable, comfortable).

- **Abstracting Ability**: ask pilot to define similarities/differences between tree-bush, child-midget, king-president, character-personality. This is more reliable than interpreting proverbs (stitch in time, bird in the hand).

- **Insight**: understanding of any personal dysfunction affecting self or others, and its need for treatment. Insight is **lacking** if there is an unacknowledged problem, **superficial** if it is only acknowledged (“It is a problem.”), **moderate** if it is personalized (“I have a problem”), and **profound** if “It’s my problem, and it’s up to me to fix it.”
Criteria for the Diagnosis of Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD)

Before a diagnosis of ADD/ADHD can be made, the following criteria (from DSM IV) must be fulfilled:

A. Either (1) or (2):

1. Six (or more) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
   - Often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
   - Often has difficulty sustaining attention in tasks or play activities
   - Often does not seem to listen when spoken to directly
   - Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
   - Often has difficulty organizing tasks and activities
   - Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
   - Often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
   - Is often easily distracted by extraneous stimuli
   - Is often forgetful in daily activities.

2. Six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
   - Hyperactivity
     - Often fidgets with hands or feet or squirms in seat
     - Often leaves seat in classroom or in other situations in which remaining seated is expected
     - Often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
     - Often has difficulty playing or engaging in leisure activities quietly
     - Is often "on the go" or often acts as if "driven by a motor" often talks excessively
   - Impulsivity
     - Often blurts out answers before questions have been completed
     - Often has difficulty awaiting turn
     - Often interrupts or intrudes on others (e.g. butts into conversations or games)
Criteria for the Diagnosis of Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g. at school [or work] and at home).

D. Clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g. Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

Specify Types:

- **Attention-Deficit/Hyperactivity Disorder, Combined Type**: if both Criteria A1 and A2 are met for the past 6 months.

- **Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type**: if Criterion A1 is met but Criterion A2 is not met for the past 6 months.

- **Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type**: if Criterion A2 is met but Criterion A1 is not met for the past 6 months.
**Designated Aviation Medical Examiner’s Handbook**

**Revision History**

Approved by Assistant Director, Aviation Safety Standards  Version 3.6: November 2008

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**Note:** The Revision History shows the most recent amendment first. Scroll down the table to view details of previous amendment information.

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# Designated Aviation Medical Examiner's Handbook

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Foreword

As a Commonwealth government authority, CASA must ensure that its decision-making processes are effective, fair, timely, transparent, consistent, properly documented and otherwise in accordance with the requirements of the law.

Most of the regulatory decisions CASA makes are such that conformity with authoritative policy and established procedures will be conducive to the achievement of these outcomes. From time to time, however, decision-makers will encounter situations in which the strict application of policy, in the making of a decision involving the exercise of discretion, would not be appropriate. Indeed, in some cases, the inflexible application of policy may itself be unlawful.

This preface and the following Introduction, explains the way in which the policy and processes set out in this manual are to be used by all CASA’s personnel when making decisions in the performance of their functions, the exercise of their powers and the discharge of their duties. It also explains the processes to be followed if it appears that a departure from policy is necessary or appropriate.

Mandatory Use of Policy and Procedure Manuals

This manual is one of the set of manuals and other documents which comprise CASA’s authorised document set. The authorised document set contains the policy, processes and procedures with which CASA personnel are expected to comply when performing assigned tasks. All CASA personnel are required to have regard to the policies set out in this manual. Except as described in the Introduction, CASA decision-makers should not depart from these policies, processes and procedures.

John F. McCormick
Director of Aviation Safety
Introduction

Regulatory Decision Making

Where the legislation provides for one, and only one decision—the “correct” decision—is the only decision open to CASA. However, most of the decisions CASA makes involve the exercise of discretion. In such cases, there may well be more than one acceptable or correct decision. In these cases, the law requires that CASA makes the “preferable” decision, that is, the most appropriate decision, having regard to the overriding interests of safety and the obligation to be fair.

In all such cases, CASA is bound to act in accordance with the applicable rules of administrative law. These rules govern how CASA arrives at the ‘preferable’ decision in any given case. Adherence to these rules is a requirement, not an option. Decisions and actions taken in contravention of these rules are unlawful, unenforceable, and in most cases invalid. CASA is legally accountable for the decisions it makes, and CASA decision-makers are obliged to avoid the appearance, as much as the reality, of unlawful decision-making.

Sound and lawful regulatory decision-making is generally governed by the 10 rules of administrative law summarised below. Adherence to these rules is essential to CASA’s obligations of accountability and good governance.

1. **Natural Justice** (Procedural Fairness)
   - **Hearing Rule.** Persons affected by CASA’s decisions have a right to be heard. To be meaningful, the hearing rule normally requires that CASA provides persons with notice (usually in advance) that a particular decision is going to be taken, and the reasons for the decision CASA proposes to take. Without notice and a statement of reasons, there may be little point to providing a person with an opportunity to be heard.
   - **Rule Against Bias.** Decision-makers should not have a personal or pecuniary interest in the outcome of their decisions. Neither may decision-makers prejudge (or pre-determine) matters in respect of which they are called upon to make a decision.

2. A decision-maker must not act for **improper purposes.** Even if the purposes for which a particular decision are lawful, the decision may only be taken for the purposes specifically authorised by the law under which the decision has been taken.

3. A decision-maker must not take any **irrelevant considerations** into account in coming to a decision.

4. A decision-maker must take all **relevant considerations** into account in coming to a decision.
5. A decision-maker must act on the basis of **evidence**, not mere supposition or speculation.

6. A decision-maker must not formulate requirements in **vague** or **uncertain terms**.

7. A decision-maker must not **inflexibly apply policy** (although departures from policy will normally need to be justified).

8. A decision-maker must not **act under dictation** (although this does not preclude adherence to formal directions, compliance with lawful conditions in relation to the process by which a decision is taken or the obligation to consult in the process of considering a decision).

9. A decision-maker must decide the matter within a **reasonable time**.

10. A decision maker must not act in a way that is manifestly **unreasonable**. A decision must not be so unreasonable that no reasonable person would make such a decision.

**Note:** The meaning and application of these principles, and related considerations of administrative law, are covered more fully in the induction and orientation training undertaken by all CASA employees. Any questions in relation to these matters should be referred to the Legal Services Division.

**Departure from Authorised Policy**

Adherence to CASA's authorised policies will almost always produce an appropriate decision. As said, however, from time to time there will be circumstances in which the strict application of policy may not result in the “preferable” decision. In these cases it may be appropriate (and possibly necessary) to depart from otherwise applicable policy.

Any departure from policy must be justified in order to ensure that it:

- Is genuinely necessary in the interests of fairness
- Does not inappropriately compromise the need for consistent decision-making; and, of course
- Is not in conflict with the interests of safety.

Without fettering a decision-maker’s discretion, it is therefore expected that appropriate consultation will occur before a decision is made that is not the product of the policies and processes set out in this manual. The prescribed consultation process is described below.
Consultation Process

Decision-Maker’s Responsibilities

When a decision-maker believes there is a need to depart from policy he or she is expected to consult with his or her direct supervisor. This process should be initiated in writing:

Setting out the pertinent facts and circumstances

Identifying the provisions of the policy normally applicable

Stating why the application of that policy would not result in the making of the “preferable” decision in the circumstances to hand

Specifying the approach the decision-maker believes is more likely to result in a “preferable” decision.

Supervisor’s Responsibilities

In considering a consultative referral, the decision-maker’s supervisor should:

Advise the decision-maker as to whether his or her assessment of the relevant considerations appears to be complete and correct

If, in the opinion of the supervisor, the circumstances do not warrant a departure from policy, provide the decision-maker with written advice and guidance as to how the decision might more properly be approached within the current policy framework

Note: Reliance on relevant precedent is a sound basis on which to ground such an opinion. It may also be helpful to seek advice from peers, superiors and/or CASA’s Legal Services Division.

If, in the opinion of the supervisor, a departure from policy is warranted, the supervisor should ensure the policy sponsor (normally the relevant Executive Manager) is advised of:

i. The intention to depart from the otherwise applicable policy
ii. The alternative approach the decision-maker will be taking to the matter.

The supervisor should ensure that a full written record of these actions is made and maintained.
**Note:** In no case may the terms of decision be dictated to a delegate authorised to exercise discretionary decision-making powers.

If a decision-maker’s supervisor or the policy sponsor is not satisfied that the decision the decision-maker intends to make is the correct or preferable decision in all the circumstances, responsibility for that decision should be assumed by, or assigned to, another authorised delegate in accordance with appropriate processes and procedures.

**Policy Sponsor’s Responsibilities**

If the policy sponsor concurs in the proposed departure from policy, he or she should ensure the decision-maker is advised accordingly as soon as possible.

If the policy sponsor does not believe the proposed departure from policy is warranted, he or she should:

- Advise the supervisor accordingly
- Assume responsibility for the decision
- Ensure that the decision-maker and any person affected by the decision (for which the policy sponsor has assumed responsibility) is advised accordingly
- Make the decision in a manner consistent with the applicable policy.

The policy sponsor should ensure that a full written record of these actions is made and maintained.

Nothing in these processes should be interpreted or applied so as to dictate the terms of the decision to be made by a decision-maker authorised to make discretionary decisions under the civil aviation legislation, or to delay unreasonably the making of such decisions.

**Revisions to Policies and Manuals**

As a result of experience in applying policies and procedures, users will form views as to accuracy, relevance and applicability of the content.

CASA personnel are required to provide recommendations for revisions to policies and processes in this or any other manual should they become aware of shortcomings. In this way the policies and manuals will be continually improved and remain relevant to the tasks being undertaken.
Each policy and manual has a sponsor and recommendations for amendment are to be forwarded to the relevant individual for consideration. The revision process can be accessed via the link:

http://casaconnect/manuals/doc_control/process.htm
1. Administrative Aspects
1.1 Introduction

1.1.1 Abbreviations Used in this Handbook.

ARN     Aviation Reference Number
AMSANZ  Aviation Medical Society of Australia and New Zealand
ASAM    Australasian Society of Aerospace Medicine
AsMA    Aerospace Medicine Association
ATPL    Airline Transport Pilot Licence
CAA     Civil Aviation Act
CAR     Civil Aviation Regulations
CASR    Civil Aviation Safety Regulations
CASA    Civil Aviation Safety Authority (Australia)
DAEE    Designated Aviation Eye Examiner
DAME    Designated Aviation Medical Examiner
DAO     Designated Aviation Ophthalmologist
FAA     Federal Aviation Administration (US)
IAASM   International Academy of Aviation and Space Medicine
ICAO    International Civil Aviation Organization
JAA     Joint Aviation Authorities (Europe)
MRS     Medical Records System Online
PMO     Principal Medical Officer

1.1.2 The Origin and Development of the CASA DAME Handbook

CASA and its antecedent organizations have published advice for DAMEs concerning practical and administrative aspects of their duties for many years. The most comprehensive and semi-permanent repository of such advice has been CASA’s DAME Handbook, which originated in the late 1980s. The original hard copy publication was an amalgam of advice derived from many sources. Some of the material can be traced back to directives produced by the Aviation Medicine Branch within the Australian Department of Civil Aviation during the 1950s. A considerable debt is due also to earlier published advice from other Regulators, particularly CAA (New Zealand) and the US FAA.

The DAME Handbook was never intended to be completely prescriptive or authoritative, particularly in its more clinically oriented sections. The principal purpose of creating (and maintaining) such a publication is to provide a compact ready reference for DAMEs and anyone else in CASA’s procedures related to aeromedical certification. Soon after the DAME Handbook was first published, a need for further explanation and elaboration of its contents became obvious, leading to creation of periodic DAME Newsletters issued by the Director of Aviation Medicine. Jointly, these publications aspired to answer DAMEs’ FAQs and to provide guidance that would reduce errors and facilitate expeditious handling of the medical examinations and reports concerning applicants prepared for CASA.
By 1998, *The DAME Handbook* was showing distinct signs of nearing the end of its useful life. Parts of the *Handbook* had been so qualified and specifically interpreted that it was sometimes difficult for DAMEs and even for staff of CASA Aviation Medicine Section to understand all requirements. Thereafter, an interim revision was produced to remove the more glaring inconsistencies and contradictions that existed between it and some DAME Newsletters. At the same time, CASA had determined that all its future public documents should be created and maintained in electronic format, available on-line, rather than as hard copy. This decision had other major implications, particularly the accessibility of all such documents to unrestricted public scrutiny.

The first on-line version of *The DAME Handbook* was posted on CASA’s website in May 1999. It represented only an interim answer to a continuing need to provide succinct, accessible, relevant advice to DAMEs and other interested persons. At that stage, much of its contents still derived from the reverence accorded to our authoritative forebears, who had not been constrained to reach decisions on evidence-based medicine principles. At least the style was brought into line with modern CASA standards.

The next priority was to review the contents of the system-based chapters in Section 2. This task has continued ever since. CASA intends that this process will continue indefinitely, to ensure relevance and currency of guidance provided. CASA is committed to procedural transparency and to meeting best-practice standards in all of its activities. Aviation Medicine Section’s accelerating, continuous review of *The DAME Handbook* reflects that commitment and will result in the availability of a better, cross-referenced and more practically useful guide.

1.1.3 Appointment and Legal Status of Designated Aviation Medical Examiners (Target Audience of the Handbook)

In order to utilise a Flight Crew Licence or Air Traffic Service Licence, it is necessary to have a medical clearance at a standard appropriate to the licence held. Within Australia, designated medical practitioners perform the necessary medical examinations for the Aviation Medicine Section of the Civil Aviation Safety Authority.

Designated medical practitioners perform medical examinations to meet the provisions of the Civil Aviation Act, the Civil Aviation Regulations and the Civil Aviation Safety Regulations. The practitioners approved to perform these examinations are known as Designated Aviation Medical Examiners (DAMEs) or Designated Aviation Ophthalmologists (DAOs). They are responsible to the Principal Medical Officer, who oversees the administration of the DAME and DAO systems.

In order to meet CASA’s needs and the needs of applicants for medical certification, appropriately qualified holders of certain positions are also permitted to undertake the duties of DAMEs and DAOs.
1. Administrative Aspects
1.1 Introduction

In order to meet CASA’s needs and the needs of applicants who are distant from regular examiners for medical certification, appropriately qualified individual practitioners may also be permitted, as needed, to undertake the duties of DAMEs and DAOs.

Certain optometrists are also approved to perform all those examinations usually carried out by DAOs. These practitioners are known as Designated Aviation Eye Examiners (DAEEs).

To request appointment or reappointment as a DAME, DAO or DAEE, complete a CASA application form (Form 755). Intending applicants may wish first to obtain additional information from one of CASA’s DAME Liaison Officers.

1.1.4 Qualifications and Experience

1. Medical practitioners designated by CASA to perform Air Crew and Air Traffic Services medical examinations must be registered with the medical registration authority of the State or Territory of the Commonwealth or country in which they reside.

2. As a signatory to the Chicago Convention, Australia is bound to appoint as DAMEs only medical examiners that have had appropriate training in aviation medicine. Possession of the Australian Certificate in Civil Aviation Medicine or similar qualification is the normal minimum requirement for appointment as a DAME. A list of courses that CASA will routinely approve for this purpose is available on the CASA website. Applicants for appointment as DAMEs on the basis of completion of other courses should contact CASA’s DAME Liaison Officers to discuss requirements.

Prior to appointment, and periodically thereafter, DAMEs are required to give an undertaking to abide by specified conditions of appointment. This is contained in Form 755.

3. DAMEs are required to attend periodic training seminars or courses in aviation medicine approved by CASA. Routinely approved seminars or courses will be posted on the CASA website. Attendance at an aerospace medicine scientific meeting such as those conducted by ASAM (formerly AMSANZ), AsMA, IAASM, FAA, CASA or similar bodies is sufficient to meet this requirement. DAMEs may also apply individually for approval of other appropriate training activities. Documented attendance at an appropriate activity is usually required at least once every two years.

Because DAOs and DAEEs examine and report only on applicants’ vision, they are encouraged but not required to undertake appropriate training in aviation medicine. However, these practitioners are required to undertake continuing professional education approved by CASA. (CASA will accept evidence of completion of continuing professional education required by an appropriate professional college, association or registration authority as satisfying this requirement).
4. DAMEs resident in Australia are required to effect and maintain membership of the Aviation Medical Society of Australia and New Zealand/the Australasian Society of Aerospace Medicine.

5. DAOs and DAEEs resident in Australia are required to effect and maintain membership/associate membership, as appropriate, of the Aviation Medical Society of Australia and New Zealand/the Australasian Society of Aerospace Medicine.

6. All designated examiners should, as far as possible, be aware of the conditions in which applicants for medical certification are employed or operate. CASA encourages designated examiners to acquire practical experience of these conditions.

7. Designation is usually granted only to practitioners in full-time practice and for one address. Continued designation is subject to the terms set out in the application for appointment in Form 755.

1.1.5 Duration of Designation

CASA appoints DAMEs, DAOs and DAEEs for periods specified at the time of appointment. They are required to re-apply for appointment at the end of each such period.

Designation lapses if the designated examiner ceases to practise at the location for which he/she is appointed, unless CASA approves a changed practice location.

Designation lapses if the designated examiner fails to observe the relevant conditions of appointment as set out in Form 755.

Designation does not automatically extend to a designated examiner’s partners, assistants, locums or successors without prior CASA approval, which should be sought well in advance of any anticipated need. Designated examiners who wish to have other practitioners act in their stead should contact CASA to ascertain precise requirements. For DAMEs’ proposed locums, completion of an approved aviation medicine course is a prerequisite for approval. CASA does not usually approve locum appointments for periods of less than four weeks.
1.1.6 Duties and responsibilities of DAMEs

CASR 67.125 1. On becoming aware of any condition of potential aeromedical significance in the holder of or applicant for an aviation medical certificate, the DAME must notify CASA of full details within five working days. Note that certain minor conditions (see 1.4.5 Temporary Incapacity of Certificate Holders) need not be reported until the applicant’s next-following routine medical assessment. CASR 67.125 refers.

CASR 67.170 2. The DAME must be satisfied as to the identity of each applicant for medical certification. Unless the DAME personally knows the applicant, he/she must sight a photographic identity document of the applicant. Subsequently, the DAME is required to certify that he/she has formally identified each applicant. CASR 67.170 refers.

Note: It is prudent to remind applicants, when making appointments, of the need to bring photographic identification to their appointments.

3. The DAME is to answer the medical history questions in the medical assessment report, in conjunction with the applicant, and ensure that the applicant understands each such question.

4. The DAME is to examine personally each applicant presenting for examination, and record the results in the medical assessment report.

5. The DAME is to perform or arrange for any investigations or specialist assessments that are necessary for the examiner to be satisfied that the applicant meets the medical standard for the class of medical certificate sought. See Examiners With Farnsworth Lantern Testing Facilities on the CASA website.

6. The DAME is to comply with CASA’s directions concerning completion and lodgement of medical reports.

7. The DAME is to forward to CASA each medical report or ancillary report received concerning an applicant for medical certification. In usual circumstances, all such reports should be dispatched within 14 days of receipt unless the DAME has contacted CASA and a different schedule has been agreed.

8. The DAME is to ensure that the applicant signs the required statement on completion of the examination. Thereafter, the DAME is to complete his/her details on the statement, and forward it to CASA within the specified period. Under no circumstances should the statement be given to the applicant to dispatch to CASA.
9. The DAME is to maintain an up-to-date knowledge of the relevant civil aviation medical standards and techniques required by CASA and by ICAO, and also interpret these requirements for applicants for medical certification. In particular, the DAME is to acknowledge promptly advice from CASA on publication of DAME Newsletters or of changes to the DAME Handbook.

10. The DAME is to notify CASA promptly of any change of address, change of e-mail address, change of telephone number, or absence from practice for periods of four weeks or more.

11. The DAME is to display his/her certificate of appointment as a DAME in his or her professional rooms.

12. The DAME is to return his/her official stamp to CASA on cessation of appointment.

13. The DAME is to use his/her official stamp only for CASA-related purposes. In particular, it should not be used as a means of certifying completion of any medical examinations not required by CASA.

14. CASA requests that DAMEs inform the Authority of details when they learn of the death of any medical certificate holder. (Although this is not a requirement of appointment, such notice is useful for CASA’s monitoring of the health of Australia’s aviation workforce.)

### 1.1.7 Duties and Responsibilities of DAOs and DAEEs

**CASR 67.125**

1. On becoming aware of any condition of potential aeromedical significance in the holder of or applicant for an aviation medical certificate, the DAO or DAEE must notify CASA of full details within five working days. Note that certain minor conditions need not be reported until the applicant’s next-following routine medical assessment (see 1.4.5 Temporary Incapacity of Certificate Holders). CASR 67.125 refers.

**CASR 67.170**

2. The DAO or DAEE must be satisfied as to the identity of each applicant for medical certification. Unless the DAME or DAEE personally knows the applicant, he/she must sight a photographic identity document of the applicant. Subsequently, the DAO or DAEE is required to certify that he/she has formally identified each applicant. CASR 67.170 refers.

**Note:** It is prudent to remind applicants, when making appointments, of the need to bring photographic identification to their appointments.

3. The DAO or DAEE is to examine personally each applicant presenting for examination, and record the results in the eye examination report.
4. The DAO or DAEE is to comply with CASA’s directions concerning completion and lodgement of eye examination reports. See *Examiners With Farnsworth Lantern Testing Facilities* on the CASA website.

5. The DAO or DAEE is to ensure that the applicant signs the required statement on completion of the examination, enter his/her details on the statement, and forward it to CASA within the period specified.

6. The DAO or DAEE is to maintain an up-to-date knowledge of the relevant civil aviation medical standards and techniques required by CASA and by ICAO, and also interpret these requirements for applicants for medical certification. In particular, the DAO or DAEE is to acknowledge promptly advice from CASA on publication of DAME Newsletters or of changes to the DAME Handbook.

7. The DAO or DAEE is to notify CASA promptly of any change of address, change of e-mail address, change of telephone number, or absence from practice for periods of four weeks or more.

8. The DAO or DAEE is required to display his/her certificate of appointment as a DAO or DAEE in his or her professional rooms.

9. The DAO or DAEE is to return his/her official stamp to CASA on cessation of appointment.

10. The DAO or DAEE is to use his/her official stamp for CASA-related purposes only.

### 1.1.8 Facilities and Equipment

DAMEs are required to provide the facilities and equipment as set out in Form 755 under *Conditions of Appointment* of DAMEs – paragraph 5.

DAOs and DAEEs are required to provide appropriate facilities and equipment for eye examinations as required by CASA.

### 1.1.9 Powers under the Civil Aviation Regulations

The Civil Aviation Safety Regulations confer the following powers on DAMEs:

CASR 67.210

- Extension of the period in force of a current medical certificate, unless it bears the condition ‘Renew by CASA only’. Refer CASR 67.210.
Designated Aviation Medical Examiner's Handbook

1. Administrative Aspects

1.1 Introduction

Approved by Assistant Director, Aviation Safety Standards  Version 3.0: December 2003

- Renewal of the validity of a medical certificate that expired within three months of the examination, unless it bears the condition 'Renew by CASA only'. Refer CASR 67.225.

- Direction of an applicant for medical certification to provide or to authorise release by other parties of any information necessary to determine whether the applicant meets the required medical standard for certification. Refer CASR 67.225(3)

- Certification of continuing fitness for duty of pregnant air traffic control staff during late pregnancy. Refer CASR 67.235(2).

- Certification of return of fitness to exercise privileges of a licence in a medical certificate holder who has been affected by a medically significant condition for a prescribed period. Refer CASR 67.265(4) and CASR 67.270(3)

1.1.10 Responsibilities Under the Civil Aviation Regulations

The Civil Aviation Safety Regulations confer the following responsibilities on DAMEs:

- To comply with any applicable requirements contained in the DAME Handbook
- To observe of the Code of Ethics of the Australian Medical Association
- To attend appropriate continuing education activities relevant to their aviation medicine practice
- To report to CASA within five working days any safety-relevant condition detected in an applicant
- To complete and promptly forward to CASA a Notice/Declaration/Consent/Authorisation: Medical Certification of Applicants form in respect of each applicant examined. Note that part of this process requires the DAME to certify the identity of the applicant.

Further details appear in CASRs 67.060 and 67.170.

The Civil Aviation Safety Regulations confer the following responsibilities on DAOs and DAEEs:

- To comply with any applicable requirements contained in the DAME Handbook.
- To observe of the Code of Ethics of the Australian Medical Association or the Optometrists’ Association Australia, as appropriate.
- To report to CASA within 5 working days any safety-relevant condition detected in an applicant.
Further details appear in CASRs 67.080 and 67.170.

When CASA (or a DAME, DAO or DAEE) refers an applicant to a specified medical specialist of its / the referring practitioner’s choice for investigation and / or report, CASA expects that the medical specialist concerned will observe an appropriate, ethical level of professional impartiality. Supreme Court of the ACT Practice Direction No 3 of 2002 (and similar court directives issued in other Australian jurisdictions) provides relevant guidance. If in doubt as to requirements, referring professionals are invited to contact CASA Aviation Medicine Section to discuss the matter.

1.1.11 Protection Under the Civil Aviation Regulations

Civil Aviation Safety Regulations provide complete indemnification against civil or criminal liability for any medical practitioner or other nominated person or organisation that, in good faith, performs an indemnified act in accordance with the Regulations. Refer CASR 67.140.

For this purpose, ‘an indemnified act’ means any act whereby a DAME, other medical practitioner or other specified person (including a DAEE) advises CASA of any concerns over the ability of a medical certificate holder or applicant to meet a required medical standard for such certification. CASA requires such advice to be provided in writing.

1.1.12 Fees

CASA does not set or recommend fees for general DAME, DAO or DAEE examinations.

In the case of CASA employees who are required to hold aviation licences to perform their duties and are thus entitled to reimbursement from CASA for the cost of examinations and any related tests, CASA will reimburse fees determined as reasonable by the CASA PMO. In general, CASA will accept as reasonable, fees that closely approximate the fees recommended in the current edition of the *AMA List of Medical Services & Fees*. Any additional amounts will be the responsibility of the examinee. In cases of doubt or unusual complexity, examiners are invited to discuss the matter with the CASA PMO. Note that CASA will not accept responsibility for any treatment expenses incurred by its employees arising from findings in the course of routine assessments for medical certification.

When presenting for assessment, CASA employees should either present a CASA claim for payment form, with details of where to send it to obtain payment, or personally pay for the consultation and claim reimbursement from CASA. Examiners should not send accounts to Aviation Medicine Section unless this has been previously agreed as the result of a specific request from Aviation Medicine Section.
Where a DAME has been required to expend additional time and effort for a CASA employee in arranging specialist referrals or investigations, obtaining and interpreting copies of reports, or on similar activities, an approach to the CASA PMO for a higher-than-normal fee may be considered.

Additional Examinations

Where additional consultations or investigations are necessary to ascertain if an applicant for medical certification meets the required medical standard, the applicant is usually responsible for meeting any costs involved. If such tests are undertaken principally for screening purposes, they will not generally be eligible for rebate from the Health Insurance Commission (HIC). However, if additional tests are required to elucidate a health problem for which medical opinion, investigation or treatment is clinically necessary, these should be rebatable. Affected applicants should be advised to discuss their individual cases with the HIC.

In the case of CASA employees who are required to hold aviation licences to perform their duties and are thus entitled to reimbursement from CASA for the cost of examinations and any related tests, CASA will reimburse fees determined as reasonable by the CASA PMO for additional consultations or investigations necessary to ascertain if the employee meets the required medical standard. In general, CASA will accept as reasonable, fees that closely approximate the fees recommended in the current edition of the *AMA List of Medical Services & Fees*. Any additional amounts will be the responsibility of the examinee. Note that CASA will not accept responsibility for any treatment expenses incurred by its employees arising from findings in the course of routine assessments for medical certification.
1.2.1 Licences – General

Aircrew and air traffic services licences are issued to applicants who have met the relevant technical and theoretical standards. Once a licence is issued, it continues in effect indefinitely. A valid medical certificate appropriate for the class of licence must accompany the licence for the licence holder legally to exercise the privileges of the licence.

1.2.2 Classes of Medical Certificates for Licence Types

There are three medical standards relating to the various types of licences held. These three standards relate to Class 1, 2 and 3 Medical Certificates.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Applicable to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>All professional technical aircrew of powered aircraft, and is required for issue of Airline Transport Pilot Licence, Commercial Pilot Licence, Flight Engineer or Flight Navigator Licences.</td>
</tr>
<tr>
<td>Class 2</td>
<td>Student Pilot, Private Pilot, Commercial Pilot Balloons and Flight Radio Operator Licences.</td>
</tr>
<tr>
<td>Class 3</td>
<td>Air Traffic Control staff.</td>
</tr>
</tbody>
</table>

1.2.3 Duration of Validity

See 1.4.7 Special Periodic Examinations Required.

Unless otherwise advised by the Aviation Medicine Section:

- Class 1: Medical Certificate is valid for one year (but see 1.4.7 Special Periodic Examinations Required).
- Class 2: Medical Certificate is valid for four years, for applicants less than 40 years of age on the day of issue, and in all other cases for two years.
- Class 3: Medical Certificate is valid for two years.

Where an applicant’s medical condition is under review, the duration of Medical Certificate validity may be varied at the discretion of the Principal Medical Officer.
1.2.4 Special Reports and Tests Required for Medical Certification

<table>
<thead>
<tr>
<th>Class</th>
<th>Initial Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>ECG, audiogram, estimation of fasting serum lipids and fasting blood glucose and an examination by CASA Designated Aviation Ophthalmologist.</td>
</tr>
<tr>
<td></td>
<td><strong>Renewals</strong> ECGs are required at the first renewal after the 25th, 30th, 32nd, 34th, 36th, 38th and 40th birthdays, and annually thereafter. Audiograms are required at the first renewal after the 25th birthday and every fifth birthday thereafter. Estimation of fasting serum lipids and of fasting blood glucose is required at the first renewal after the 25th birthday and every fifth birthday thereafter. Examination by CASA Designated Aviation Ophthalmologist at age 60 and at two-yearly intervals thereafter.</td>
</tr>
<tr>
<td>Class 2</td>
<td>Where an applicant for original medical certification has a visual acuity &lt; 6/60 in either eye, an ophthalmic report from an ophthalmologist or optometrist (preferably a DAO or DAEE) is required. There are no other special requirements, except where an examiner determines a clinical indication exists.</td>
</tr>
<tr>
<td>Class 3</td>
<td>ECG, audiogram, estimation of fasting serum lipids and fasting blood glucose and an examination by CASA Designated Aviation Ophthalmologist.</td>
</tr>
<tr>
<td></td>
<td><strong>Renewals</strong> ECGs are required at the first renewal after the 25th and 30th birthdays and every two years thereafter, ie, at every subsequent routine examination. Audiograms are required at the first renewal after the 25th birthday and then at each renewal after every fifth successive birthday. Estimation of fasting serum lipids and of fasting blood glucose is required at the first renewal after the 25th birthday and then at each renewal after every fifth successive birthday. Examination by CASA Designated Aviation Ophthalmologist at age 60 and at two-yearly intervals thereafter.</td>
</tr>
</tbody>
</table>

See also section 1.4.1 Electrocardiographs.
1.3 The Medical Assessing System

1.3.1 General Matters

From 2003, CASA has adopted a medical assessing system intended to automate the process of medical certification to the greatest extent practicable. The technological platform for this process is a computer-based system known as the CASA Medical Records System Online (MRS Online). Intended future development of MRS Online will further improve the speed and accuracy of medical certification.

Once MRS Online became fully operational, CASA decommissioned the former paper-based medical reporting system, which relied on optical scanning to capture and store data from routine medical assessments. CASA no longer maintains a capability to process paper-based routine reports of medical assessments. Consequently, any paper-based medical examination and report forms received are returned to the originator and a notice sent to the examinee advising him/her that the medical report has not been processed and that another is required. Note that further exercise of licence privileges is not permitted until medical certification via MRS Online is complete.

Pending further development of MRS Online, hard copies of applicant statement and examiner certification forms are still required.

CASA continues to accept hard copies of other medical reports, particularly ECGs, because of the time taken to transmit such documents electronically from some computer servers. However, CASA’s preference is for such documents to be scanned and transmitted electronically as attachments to the medical assessment form. In the near future, this will become the only available means for their lodgement.

If, for any reason, an examiner is unable to transmit a medical assessment form to CASA electronically, it is temporarily possible for an examination form to be mailed to the examiner on diskette. Once completed, the diskette can be returned and CASA can then load it manually into MRS Online. CASA does not intend to support this option in the long term because it vitiates many of the efficiency benefits available from MRS Online.

1.3.2 Medical and Ophthalmological Assessment Forms

Prior to undertaking any aeromedical examination, the examiner is to inform each applicant of the possible legal consequences of a deliberate false statement made with the intention of obtaining a medical certificate (see CASR 67). Thereafter, the examiner should obtain the applicant’s signature and complete the applicant statement and examiner certification form and record all relevant historical details obtained from the applicant.
CASA requires that the DAME personally ask the applicant the questions in the medical history section of the medical assessment report, then personally record the answers given. This allows the DAME to assess the applicant’s understanding of the questions and to provide any necessary explanations.

CASA similarly requires that the DAO/DAEE personally ask the applicant the questions in the medical history section of the eye assessment report, and personally record the answers given. This allows the DAO/DAEE to assess the applicant’s understanding of the questions and to provide any necessary explanations.

Slightly different historical data are required from applicants for original medical certification, where fuller details are sought, and from applicants for renewal medical certification. MRS Online automatically generates the appropriate questionnaire for each examination on the basis of its own records and/or input data.

MRS Online automatically generates an original medical history questionnaire whenever a period of 5 years or longer has passed since the applicant’s last medical assessment report.

Where the holder of an existing class 2 medical certificate applies for medical certification at class 1 or 3 level, MRS Online will automatically generate an original medical history questionnaire.

1.3.3 The Medical Certificate

Civil Aviation Safety Regulations require an aviation licence holder to have a current, valid medical certificate appropriate to the class of licence held in order to validate the licence holder’s exercise of privileges conferred by the licence. That is, in order to exercise the privileges of an aviation licence, the licence holder must have both a licence and a valid medical certificate for the class of licence.

The medical certificate confirms that the applicant has been medically assessed, details the class of medical certificate held, the validity date, and confirms either that the required medical standard is met or details of any restrictions imposed by CASA which affect the medical certificate’s validity and therefore the use of the licence (refer 1.5.2 Frequently Used Conditions Endorsed on Medical Certificates). For professional licence holders, it also notes the dates of most recent additional examinations required (refer 1.4.6 Additional Investigations and Specialist Opinions).
DAMEs are not authorised to issue interim original medical certificates. Where permitted by Civil Aviation Safety Regulations (see CASR 67.220 and 67.225) they may revalidate an existing current medical certificate or one that has expired for less than three months (see following Section). Legally, every medical certificate is a new medical certificate. The ‘new’ medical certificates issued by DAMEs under provisions of CASR 67.225 actually refer to revalidated medical certificates that have expired for less than three months.
1.3.4 Medical Certificate Revalidation

DAMEs are not permitted to revalidate medical certificates endorsed ‘Renew by CASA only’. Affected applicants are encouraged to return to the DAME for early review, leaving adequate time for CASA to receive the periodic medical assessment and any other required reports and to make a determination on fitness for renewed medical certification.
On completion of the medical assessment, provided that the applicant appears to meet the required medical standard and provided the medical certificate has not been endorsed ‘Renew by CASA only’, the DAME may revalidate an applicant’s medical certificate only, as follows (refer CASR 67.220):

- If the applicant’s medical certificate has not expired and the assessment is conducted more than 28 days before the expiry date shown on the certificate—for up to two calendar months from the date of the assessment. (But see ‘Exception for ATPL recertification’ below).

- If the applicant’s medical certificate has not expired and the assessment is conducted within 28 days preceding the expiry date shown on the certificate—for up to two calendar months beyond the expiry date shown on the certificate.

- If the applicant’s medical certificate has expired, and the assessment is conducted within three calendar months of the expiry date shown on the certificate—for up to two calendar months from the date of the assessment.

To revalidate the medical certificate, the following endorsement is required:

‘Examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (the appropriate date to be inserted is determined according to instructions in the preceding paragraph):

DAME’s signature, date, DAME stamp.

Note: Any specialist assessments required in connection with a medical certificate renewal examination need not be performed within 28 days preceding the medical certificate’s expiry date. Guidance on CASA’s usual approach to currency of specialist reports and other investigations appears under 1.8 Frequently Asked Questions.

**Exception for ATPL recertification.**

Some CASA medical standards differ from those required by ICAO (refer Section 2.15). In particular, ATPL holders aged over 40 but under 60 may receive Australian class 1 medical certification for 12 months, while ICAO countenances only six months. Because many of this group operate on international routes, CASA advises (and airlines require) that their medical certification is ICAO compliant.
Such applicants will often return for reassessment within the first 6 months of a medical certificate, which is valid for 12 months. In this circumstance, the DAME should endorse the applicant’s medical certificate as follows.

‘Re-examined dd1/mm1/yyyy1

Revalidated to dd2/mm2/yyyy2’ (this will usually be the date 2 months after the assessment date)

signature, date, DAME stamp

Subsequently, in the usual course of events, CASA will issue a new class 1 medical certificate valid for a further 12 months from the date of assessment. Alternatively, CASA may issue a new medical certificate that has the effect of extending validity for six months longer than the current certificate’s expiry date. This situation will persist while ever the medical certificate holder operates as an ATPL in international air space.

**Note:** There are a number of other differences between CASA and ICAO medical standards. These particularly concern the periods of validity for medical certificates and the frequency of certain routinely required investigations or examinations. Full details likely to be of relevance to Australian examiners will be notified from time to time in *DAME Newsletters*. Those currently of interest are shown in section 2.15 of this manual. For practical purposes, only medical certificate holders who intend to exercise the privileges of licensure in other ICAO contracting states will be affected by these differences.

### 1.3.5 Assessments Other than Pass Assessments

Only CASA’s Principal Medical Officer (PMO) has the delegated power to cancel an applicant’s medical certificate(s).

Only CASA’s PMO and other CASA medical staff have the delegated power to suspend an applicant’s medical certificate(s).

A DAME may only revalidate the medical certificate of an applicant who appears to meet the required medical standard and where the medical certificate does not bear the endorsement ‘Renew by CASA only’. If a DAME has any concerns about an applicant meeting the required medical standard, he/she must decline to revalidate the medical certificate and refer the matter to CASA for determination. Relevant specialist opinions and/or investigations should be obtained and the results forwarded to CASA, together with the DAME’s opinion concerning the applicant’s fitness for certification.
To assist CASA’s consideration of applicants where there is doubt about ability to meet the required medical standard, DAMEs should avoid vague descriptive terms in their reports. Expressions such as ‘brief’, ‘infrequent’, ‘mild’, ‘some’ or similar convey no meaningful information. CASA recommends the “6W mnemonic”.

- WHAT 1: What happened? (Detail signs and symptoms that led to the consultation, procedure performed etc).
- WHAT 2: What were the sequelae?
- WHEN: What were the dates and frequency?
- WHERE: What body part was affected? (Left or right, upper arm/forearm etc).
- WHY: Why was a procedure performed?
- WHO: Who was involved? (Who carried out a procedure/made an assessment/is undertaking follow up, etc).

Once all necessary information has been received, CASA then submits full details of the case to a panel composed of aviation medicine practitioners. When appropriate, this panel may be supplemented by clinical or other specialists. A determination on the case will then be made and the applicant notified of the result.

If an applicant is dissatisfied with the panel’s determination, a review may be requested and/or the matter may be appealed to the Commonwealth Administrative Appeals Tribunal.

### 1.3.6 Identification of CASA Examiners (DAMEs, DAOs and DAEEs)

Each designated examiner (including approved locum examiners) requires an individual Aviation Reference Number (ARN), which must be obtained from CASA – refer Form1162.

CASA issues a unique identification stamp to each DAME. Each stamp carries a state or territory based code (‘A’ for ACT, ‘Q’ for Queensland etc, or ‘I’ for International) plus a three-digit number. Similarly, CASA issues a unique identification stamp to each DAO or DAEE. These also carry an alphanumeric code designating the state or territory plus a restriction limiting examinations to applicants’ eyes (‘SE’ for South Australia, ‘VE’ for Victoria, ‘IE’ for International, etc). Each stamp is intended for the exclusive use of the individual examiner to whom it is issued and, except as provided hereafter, must not be loaned to or used by any other practitioner without prior approval by the CASA PMO.

When CASA has approved a locum to act for a DAME, DAO or DAEE, the locum is to use the appropriate principal examiner’s stamp and also identify himself/herself as a locum in accordance with CASA procedures.
Locums

Locum approval must be obtained in writing from CASA prior to the dates requested. CASA requires a written request including the requested date, the contact details and signature of the proposed locum and the CV of the proposed locum. Once locum approval is gained in writing, the locum is able to perform aviation medical examinations and/or ophthalmological examinations using the existing stamp and writing ‘locum’ next to the stamp within the requested dates.

Locums are viewed the same as DAMEs and DAOs in terms of indemnification, rights and responsibilities. Locums are required to abide by the Conditions of Appointment.

CASA also issues DAME stamps to occupants of certain identified positions who otherwise meet the requirements for appointment as DAMEs (refer CASR 67). These are senior medical positions in the Australian Defence Force (ADF) or Royal Flying Doctor Service (RFDS). Whenever an approved ADF or RFDS medical officer performs a medical assessment under the auspices of one of these identification stamps, details of the individual examiner are also required. Thus it is only possible for ADF or RFDS medical staff who have registered with CASA to perform medical assessments under the auspices of one of these stamps.

The DAME/DAO/DAEE stamp plus the examiner’s ARN must be inserted on all applicant consent and examiner certification forms before their dispatch to CASA, together with signatures of the applicant and of the examiner.

Examiners’ identification stamps should be stored securely when not in use. The unique identification number on each stamp should be used in all correspondence between the examiner and CASA.
1.4.1 Electrocardiographs

Routine electrocardiographs are required at specified intervals for class 1 and class 3 medical certification. They may also be required on clinical grounds (see Section 2.2).

All ECGs sent to CASA are to be mounted on A4 paper and must contain the following information.

- Applicant’s full name
- Applicant’s ARN
- Date of recording.

Leads should be marked on the trace and the calibration mark should be clearly visible. The tracing should be performed using standard calibration (10 mm/mV). If half calibration is needed to clarify the standard trace, both should be sent to CASA. ECGs with slurred or incorrect calibration are not acceptable.

When self-reporting ECG machines are used, the reports are to be included with the tracings.

Where an ECG is known to be abnormal, copies of the previous ECG or reference to it (particularly regarding any changes) would be helpful and should speed CASA’s evaluation of the applicant.

Note that reports (whether by the DAME or other interpreter) should accompany all ECGs sent to CASA. Except for those already reported on by an approved specialist or interpreted by a self-reporting machine, CASA will arrange for a cardiologist to report on all ECGs. This process requires up to a week.

In future, CASA anticipates enabling on-line submission of ECGs via enhanced MRS Online. By then, CASA will likely require that all ECGs are reported on by a self-reporting machine, or interpreted and reported on by a cardiologist, physician or other specialist approved by CASA.

The DAME should also examine all ECGs and assess them as normal or abnormal, then provide details of any abnormality detected in the medical report.

Original issue ECGs performed for class 1 and class 3 applicants should be dispatched to CASA immediately following the examination. The DAME should read, assess and retain any future ECGs performed, except:

- At the first renewal after a class 1 or class 3 applicant’s 25th birthday and at designated intervals thereafter (refer to 1.4.7 ‘Special periodic Medical Examinations Required’), when copies are required for the applicant’s medical record maintained by CASA; and
- Any abnormal ECG must be sent to CASA, together with a cardiologist’s or other specialist’s report as appropriate.
1.4.2 Audiograms

The pure-tone audiogram performed by a DAME or any other person is treated by the Aviation Medicine Section as a screening test only, and is never used as the final arbiter of an applicant's ability to meet the hearing requirements for a Medical Certificate. Audiograms performed by DAMEs are acceptable. However, any audiometer used for CASA-required audiograms must have been calibrated within two years of the date of such examinations.

The audiogram result is to be stated in the medical assessment form even when a printed results slip is included with the form when lodged.

DAMEs should enclose the audiogram result printout with the medical assessment forms for all original Class 1 and Class 3 applicants.

1.4.3 Special Hearing Tests

Where a supplementary speech test is required, this can only be performed by AHS as the calibrated tapes and other equipment required are not available elsewhere. If the applicant fails the speech-based hearing test, in some cases an in-flight test may be offered if he/she has a high level of aeronautical experience. Such an operational check will involve evaluation of relevant aspects of the applicant's hearing by a CASA Flying Operations Inspector or an Authorised Testing Officer with test material transmitted from a control tower. Ideally the test should be conducted in the class of aircraft that is the same as that which the applicant normally operates.

Further information is available from CASA Aviation Medicine Section.

1.4.4 Assessment by Designated Aviation Ophthalmologists or Designated Aviation Eye Examiners

An applicant for original class 1 or class 3 medical certification requires routine assessment and reporting by a DAO or DAEE.

A class 1 applicant who has attained the age of 60 years requires further routine assessment and reporting by a DAO or DAEE. Further assessments are required at intervals of every two years thereafter (refer Section 1.4.7 'Special periodic medical examinations required').

Any applicant for original medical certification who fails to meet the required visual standard also requires assessment and reporting by an ophthalmologist or optometrist, usually a DAO or DAEE. CASA will determine subsequent requirements on a case-by-case basis.
Where a DAME detects or suspects ophthalmic pathology in any applicant for medical certification, referral to a DAO for further assessment is required.

A small number of experienced class 3 medical certificate holders have been ‘grandfathered’ so as to retain their medical certification, despite being unable to meet the colour vision requirements of the class 3 standard.

### 1.4.5 Temporary Incapacity of Certificate Holders

Refer CASR 67.265 and CASR 67.270.

CASA requires medical certificate holders who experience any medically significant changes in medical condition to inform CASA or a DAME of such changes.

The information is required to be conveyed to CASA or a DAME after the applicant has been aware of the change:

- For a class 1 medical certificate holder, for longer than 7 days
- For a class 2 medical certificate holder, for longer than 30 days
- For a class 3 medical certificate holder, for longer than 30 days.

Thereafter, the DAME so informed is required to notify CASA of the matter within 5 working days. Refer CASR 67.125.

A licence holder must not perform any act authorised by the licence while he or she has a medically significant condition which impairs his or her ability to do the act. Before resuming the exercise of privileges under the licence, the licence holder must obtain prior confirmation of fitness from a DAME, as follows:

- For a class 1 licence holder, where the medically significant condition has been present for longer than 7 days
- For a class 2 licence holder, where the medically significant condition has been present for longer than 30 days
- For a class 3 licence holder, where the medically significant condition has been present for longer than 30 days.
A DAME usually need not perform a full medical examination in these circumstances, but should satisfy himself/herself that the applicant has recovered from the illness, injury or other medically significant condition and meets the required medical standard for exercise of the privileges of any licence held. Therefore, a DAME should not issue a medical certificate of the ‘X will be fit for duty from some later date’—type in anticipation of full recovery sufficient to meet the required medical standard.

Licence holders who fail to observe these requirements may be subject to heavy penalties, so DAMEs should take every opportunity to emphasise these legal requirements to them.

Certain trivial conditions in medical certificate holders need not be reported to CASA unless present at an applicant’s routine medical assessment. However, DAMEs are to advise applicants that these conditions must have resolved fully, without sequelae, prior to applicants resuming the exercise of privileges. Common examples include the following:

- Influenza, coryza, other URTI
- Cough in the absence of wheezing
- Sinusitis
- Occasional, mild headaches
- Uncomplicated urinary tract infection
- Gastroenteritis
- Uncomplicated haemorrhoid(s) if not bleeding and requiring only symptomatic treatment
- Mild allergic rhinitis, if no nasal blockage present and no antihistamine treatment required
- Minor soft tissue injuries without residual pain
- Muscular pain of short duration not requiring long-term medication and not related to any significant underlying chronic illness
- Dysmenorrhoea not requiring medication or absence from work
- Treated chronic fungal nail infections
- Dental extractions.

1.4.6 Additional Investigations and Specialist Opinions

The DAME should refer an applicant (or arrange referral through the applicant’s usual general practitioner) for appropriate specialist review(s) and/or other investigations whenever a significant abnormality in the history or physical examination of an applicant is detected. The purpose of such review or investigation is to clarify whether the applicant meets the required standard(s) for medical certification, or whether medical certification with appropriate conditions is compatible with the safety of air navigation.
Once the DAME has collated all relevant investigations and reports concerning the applicant, these should be sent to CASA, together with the DAME’s own assessment of whether the applicant meets the required standard(s) for medical certification, or whether medical certification with appropriate conditions is compatible with the safety of air navigation.

Where an applicant fails to return for follow up or completion of the assessment is delayed for more than one month for any reason, the DAME should forward to CASA advice of the situation and copies of any reports available. Thereafter, in the event of further delays, or of the applicant failing to return for review, the DAME should advise CASA as then appropriate. Written, faxed or e-mailed advice is required in these circumstances.

**Note:** MRS online will automatically capture incomplete medical examinations and highlight them for CASA’s attention 14 days after the examination has begun. CASA may then contact the DAME for an explanation of the circumstances surrounding the delayed completion of the assessment.
1.4.7 Special Periodic Examinations Required

<table>
<thead>
<tr>
<th>Certificate</th>
<th>Frequency</th>
<th>Requirements on Initial Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1 ATPL</td>
<td>12-monthly until age 60, then 6-monthly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV&lt;sub&gt;1&lt;/sub&gt;</td>
</tr>
<tr>
<td>Class 1 CPL</td>
<td>12-monthly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV&lt;sub&gt;1&lt;/sub&gt;</td>
</tr>
<tr>
<td>Class 2</td>
<td>Four-yearly until age 40, then two-yearly</td>
<td>FEV&lt;sub&gt;1&lt;/sub&gt;</td>
</tr>
<tr>
<td>Class 3</td>
<td>Two-yearly</td>
<td>Audio, Eye, ECG, Serum Lipids, Blood Glucose FEV&lt;sub&gt;1&lt;/sub&gt;</td>
</tr>
</tbody>
</table>

Examinations are as follows:

- **Audio**: Hearing test — audiogram
- **Eye**: Specialist eye examination
- **ECG**: Electrocardiogram
- **Serum Lipids**: Total Cholesterol (fasting), HDL and LDL fractions
- **Blood Glucose**: Blood Glucose (fasting)
- **Stress ECG**: Exercise ECG on Bruce Protocol (no requirement for cardiologist referral)
- **FEV<sub>1</sub>**: Peak Flow (range is within 30% of the predicted value for height, sex and age – refer chart *Peak Expiratory Flow in Normal Subjects* )

**Notes:**

1. All ECGs performed in connection with medical examinations marked with an asterisk (*) in the ‘Age’ column in the Class 1 and 3 table below are to be forwarded to the Aviation Medicine Section.
2. All abnormal ECGs are to be forwarded to the Aviation Medicine Section with medical assessment forms.
3. Each applicant for a class 1 or class 3 medical certificate who scores 15 or more points on the American Heart Association *Coronary Heart Disease Prediction Chart* must undergo a stress ECG in accordance with the instructions at Section 2.2.6.
(Notes: Contd)

4 Each applicant for a class 1 or class 3 medical certificate should have his/her risk score calculated at the original medical examination, then at the first medical examination after age 25, thereafter every 5 years until age 60, thereafter annually.

5 Fasting serum lipid estimations must include total cholesterol, high and low density lipoprotein cholesterol fractions: be certain to specify this on the pathology request form as an ‘Occupational Requirement’. (This alerts the pathology laboratory that the investigation is not HIC rebatable and usually ensures it will be performed, even when other lipid values are within normal limits).

6 On occasions, applicants may have undergone certain of these tests or specialist reviews independently of the CASA requirement. CASA will accept certified true copies of recent results (only). Guidance on acceptable recency is contained in Section 1.8. Frequently Asked Questions.
Classes 1 and 3 Additional Requirements

The table below gives the additional tests/examinations that are required at each renewal examination for applicants for **Class 1 and 3** Medical Certificates. Requirements for applicants aged more than 80 years will be advised individually.

<table>
<thead>
<tr>
<th>Age</th>
<th>Tests/Examinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>25*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>30*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>32</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>36*</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td></td>
</tr>
<tr>
<td>40*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td></td>
<td><strong>An ECG is required yearly from age 40 to 80 for Class 1 and every two years for Class 3 (see note 3 (above) re stress ECG)</strong></td>
</tr>
<tr>
<td>45*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>50*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>55*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>60*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td></td>
<td><strong>Eye</strong></td>
</tr>
<tr>
<td>62*</td>
<td></td>
</tr>
<tr>
<td>64*</td>
<td></td>
</tr>
<tr>
<td>65*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>66*</td>
<td></td>
</tr>
<tr>
<td>68*</td>
<td></td>
</tr>
<tr>
<td>70*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>72*</td>
<td></td>
</tr>
<tr>
<td>74*</td>
<td></td>
</tr>
<tr>
<td>75*</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td>76*</td>
<td></td>
</tr>
<tr>
<td>78</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>Audio Serum Lipids and Blood Glucose</td>
</tr>
<tr>
<td></td>
<td><strong>Eye</strong></td>
</tr>
<tr>
<td>&gt; 80</td>
<td>Requirements advised individually.</td>
</tr>
</tbody>
</table>
1.4 Special Investigations

Applicants for class 1 or class 2 medical certification who fail the Ishihara Pseudoisochromatic Plates (PIP) colour vision test are to be referred to a centre that conducts Farnsworth Lantern (FALANT) testing. Applicants for class 1 or class 2 medical certification who fail the Farnsworth Lantern tests are to be referred for practical signal light testing. Contact CASA Aviation Medical Section on 131 757 (toll free) or 02 6217 1641 (direct), for details of how to arrange this testing. Note that colour vision testing for these applicants is to follow the sequence PIP → FALANT → practical signal light testing. A pass on any of these tests will satisfy the requirements for issue of an unrestricted class 1 or class 2 medical certificate.

New applicants for class 3 medical certification are required to pass the Ishihara PIP colour vision test. No additional or alternative colour vision testing is available for this group. A small number of experienced class 3 medical certificate holders have been ‘grandfathered’ so as to retain their medical certification, despite being unable to meet the colour vision requirements of the class 3 standard.

For certain applicants, routine periodic urinalysis for drugs is a requirement of continued medical certification. It is medico legally essential that such testing be performed in accordance with a specified protocol. This protocol will be notified in due course.
1.5 Medical Certificate Endorsements

1.5.1 General

Whenever appropriate, CASA places a condition or conditions of use on an applicant’s medical certificate(s) which influences the validity of the medical certificate(s). Multiple conditions may be placed on a medical certificate, and different conditions may be placed on different classes of medical certificate held by an individual.

1.5.2 Frequently Used Conditions Endorsed on Medical Certificates

<table>
<thead>
<tr>
<th>Endorsement</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renew by CASA only.</td>
<td>The DAME may not revalidate the medical certificate. Any revalidation or renewal is the prerogative of CASA Medical staff</td>
</tr>
<tr>
<td>Visual correction required.</td>
<td>Applicant requires visual correction in order to meet the visual standard. Appropriate correction must be worn when exercising the privileges of the licence. (Class 3 certificates only).</td>
</tr>
<tr>
<td>Assured Visual Correction Required</td>
<td>Applicant requires visual correction in order to meet the visual standard. Appropriate correction must be worn and a spare pair of prescription spectacles must be carried/readily available when exercising the privileges of the licence.</td>
</tr>
<tr>
<td>Near Vision Correction</td>
<td>Applicant requires visual correction in Order to meet the near vision standard. Appropriate correction must be readily available and a spare pair of prescription spectacles carried/readily available when exercising the privileges of the licence.</td>
</tr>
<tr>
<td>Not valid for mustering or agricultural flying.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Valid in Australian Airspace only.</td>
<td>This endorsement indicates that the medical certificate is issued despite the holder’s failure to meet a required medical standard, as the safety of air navigation is not adversely affected. Use in any other ICAO contracting state requires specific advance approval by the Regulator for that state.</td>
</tr>
<tr>
<td>Valid in Australian airspace Only, valid up to and Including CPL</td>
<td>Self-explanatory</td>
</tr>
</tbody>
</table>
### Endorsement Interpretation

<table>
<thead>
<tr>
<th>Endorsement</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not valid for ATPL operations.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Not valid for rotary wing operations.</td>
<td>Self-explanatory.</td>
</tr>
<tr>
<td>Special conditions apply</td>
<td>Detailed, individually determined conditions are provided.</td>
</tr>
<tr>
<td>Special conditions apply, Notified in accompanying letter dated dd/mm/yyyy</td>
<td>Detailed, individually determined conditions are set out in the referenced letter, which must be carried with the medical certificate whenever exercising the privileges of the licence.</td>
</tr>
<tr>
<td>Holder to fly as or with a qualified copilot.</td>
<td>Refer 1.5.3 Multi-Crew Endorsement</td>
</tr>
<tr>
<td>Holder is required to inform employer of the nature and extent of his/her</td>
<td>Self-explanatory (Class 3 certificates only).</td>
</tr>
<tr>
<td>medical impairment and to co-operate in establishing mitigation strategies</td>
<td></td>
</tr>
<tr>
<td>to minimise the effect of this impairment</td>
<td></td>
</tr>
<tr>
<td>Holder may exercise the privileges of the licence without supervision, but</td>
<td>Self-explanatory (Class 3 certificates only.)</td>
</tr>
<tr>
<td>there must at all times be another licensed air traffic controller who is</td>
<td></td>
</tr>
<tr>
<td>aware of the holder’s impairment present and able to assume the holder’s</td>
<td></td>
</tr>
<tr>
<td>air traffic management duties should the holder experience sudden</td>
<td></td>
</tr>
<tr>
<td>incapacitation</td>
<td></td>
</tr>
</tbody>
</table>
1.5.3 Multi-Crew Endorsement

CASA uses multi-crew endorsements as a means of risk mitigation. Their use enables pilots to continue flying and air traffic control staff to continue duty despite the presence of medically-significant conditions which would otherwise pose an unacceptable risk to the safety of air navigation.

When a class 1 or class 2 medical certificate is endorsed with the condition ‘Holder to fly as or with a qualified co-pilot’, all of the following conditions apply:

1. The holder is restricted to operating either as or with a qualified co-pilot while exercising the privileges of the licence validated by the medical certificate. (Note that it is sometimes possible for an applicant to have an ‘as or with co-pilot’ restriction on a class 1 medical certificate but an unrestricted class 2 medical certificate).

2. Aircraft requirements:
   a. side-by-side seating in the cockpit
   b. fully functioning dual controls.

3. Certificate holder requirements:
   a. to wear shoulder restraint harness at all times
   b. to be prepared to relinquish command or control of the aircraft at the onset of any incapacity
   c. to ensure that the other pilot has read the requirements in this document.

4. Other pilot’s requirements:
   a. to occupy a control seat except for short absences in transport category aircraft in the cruise with the autopilot engaged
   b. to hold command endorsement for the aircraft
   c. to be current and appropriately rated for the flight
   d. to be aware of the type of incapacity the pilot may suffer in flight
   e. to be prepared to take command of the aircraft should the other pilot be unable to continue command.

**Note:** This condition does not:

a. Preclude the medical certificate holder from being left on the flight deck alone in a 2-pilot operation; or
b. limit the medical certificate holder from operating in a 2-pilot operation with another individual who has a medical certificate with this restriction; or

c. preclude the medical certificate holder from operating as a single pilot on a flight deck should the other pilot in a 2-pilot operation become incapacitated.
When a class 3 medical certificate is endorsed with the condition ‘Holder is required to inform employer of the nature and extent of his/her medical impairment and to co-operate in establishing mitigation strategies to minimise the effect of this impairment’, the following applies:

The holder who has such a restriction on a class 3 medical certificate is required to inform his/her employer of the nature and extent of his/her medical impairment and to co-operate with the employer in establishing strategies to minimise the risk of his/her impairment causing acute incapacitation. Relevant strategies may include, but are not limited to, measures such as special roster or shift arrangements, specified meal breaks, or guaranteed access to prescribed facilities.

When a class 3 medical certificate is endorsed with the condition ‘Holder may exercise the privileges of the licence without supervision, but there must at all times be another licensed air traffic controller who is aware of the holder’s impairment present and able to assume the holder’s air traffic management duties should the holder experience sudden incapacitation’, the following applies:

The holder who has such a restriction on a class 3 medical certificate is not permitted to undertake duty alone and is required to ensure, at the beginning of each shift, that his/her co-workers are aware of the type of incapacity the individual may experience while working and that at least one co-worker is available at all times to take over the individual’s air traffic management duties should such a sudden incapacitation eventuate.
1.6 Designated Aviation Medical Examiner Recommendations

1.6.1 General Matters

Procedures for dispatching routine medical assessment reports to CASA will be detailed in the *MRS Online Program Manual* currently under development.

**Applicant statement and examiner certification forms** should be forwarded to CASA as soon as possible following completion. On receipt, they will be scanned and attached to applicants’ medical files. (Note: CASA intends to develop more efficient alternatives to this procedure in subsequent versions of MRS Online).

ECG recordings, pathology and imaging reports and specialist consultation reports, as hard copies, should be forwarded to CASA as soon as possible following completion or when received by the examiner. Legible scanned copies of such documents may also be sent to CASA as attachments to medical assessment reports submitted online.

Lossy compression graphic formats such as JPEG should not be used because of the loss of information that accompanies the compression process. Do not attempt report scanning unless certain of the properties of the format used. CASA Aviation Medicine Section will provide further advice on request. (Note: CASA intends to develop subsequent versions of MRS Online that facilitate online lodgement of virtually all usually required documents).

Poor quality reproductions of such reports are of no use to CASA and DAMEs will be required to send replacements if MRS is unable to capture a legible image. This problem particularly arises with photocopied documents that are transmitted by facsimile.

Once a medical assessment report is received, the MRS Expert System will automatically determine whether or not the applicant clearly meets the medical standard(s) for the class(es) of medical certificate(s) sought. If the required medical standard is met, an automatic e-mail advice will immediately be dispatched to the originating DAME.

**CASR 67** On receipt of such e-mail advice, a DAME may revalidate an applicant’s existing medical certificate for the appropriate period specified in the Regulations. Refer **CASR 67**.

**CASR 67** If, for any reason, a DAME is unable to dispatch a routine medical assessment report immediately following its completion, but considers that an applicant meets the required standard for medical certification, the DAME may then revalidate the applicant’s existing medical certificate for the appropriate period specified in the Regulations. Refer **CASR 67**.
A DAME usually must not revalidate any medical certificate unless:

- e-mail advice from CASA confirms that the applicant meets the required medical standard; or
- he/she is unable immediately to dispatch a routine medical assessment report to CASA, but considers that the applicant meets the required medical standard; and
- the existing medical certificate does not bear the condition ‘Renew by CASA only’.

However, where the holder of a class 1 medical certificate which has been issued for 12 months is an ATPL aged over 40 who requires a medical assessment every 6 months to meet ICAO’s requirements (Refer to Section 2.15), a DAME may revalidate the existing medical certificate in the usual way for 2 months from the date of the examination, even though this period falls within the medical certificate’s continued validity for exercise of privileges in Australian airspace.

In this circumstance, the DAME should endorse the applicant’s medical certificate as follows:

‘Re-examined dd1/mm1/yyyy1
Revalidated to dd2/mm2/yyyy2’ (this will usually be the date 2 months after the assessment date)
signature, date, DAME stamp

When a medical assessment report indicates that an applicant fails to meet the required standard for medical certification in any particular, the case will then be reviewed by CASA’s clerical assessors and/or medical staff and further advice provided to the applicant, DAME or other examiner as appropriate.
1.7.1 Aviation Reference Number (ARN) Identification

An applicant's Aviation Reference Number (ARN) must accompany all medical reports, ophthalmologists' reports, audiology reports and other specialists' reports and all correspondence concerning applicants sent to Aviation Medicine Section. All applicants should obtain an ARN prior to making an appointment with a DAME, DAO or DAEE for Original assessment. An ARN is required so the DAME or other examiner can connect to CASA's Medical Records System (MRS) to enter the applicant's medical details.

1.7.2 Aviation Reference Number (ARN) Registration

Application for an ARN can be made in person or by post. Application forms are available from the CASA website – refer Form 1162. Alternatively, visit one of the CASA Area Offices to apply in person.
A selection of frequently asked questions and answers to them is given below.

Q. When an applicant has had a required test or consultation independently some time before an equivalent CASA-required examination etc, under what circumstances will CASA accept such an examination in lieu of its own requirement?

A. The results of such external examinations are usually accepted only:
   - where the result/report is credible in all the circumstances;
   - where all parameters which CASA requires to be addressed in the report have been so addressed; and
   - where the reported findings are sufficiently recent to be likely still valid at the time of the applicant’s assessment for medical certification.

**Note:** CASA will not usually accept ophthalmological or audiometry reports which have not been completed on its own (electronic) stationery, even when these tests were performed for another Regulator, because of slightly different requirements and potential difficulty with interpretation.

Q. When an applicant has had a required test or consultation independently some time before an equivalent CASA-required examination etc, and it appears otherwise acceptable per provisions of the preceding paragraph, for how long will CASA deem such an examination to remain valid in lieu of its own requirement?

A. The usual maximum validity periods for independent routine test reports which CASA will accept are:

<table>
<thead>
<tr>
<th>Test</th>
<th>Validity Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audiogram</td>
<td>12 months</td>
</tr>
<tr>
<td>ECG</td>
<td>6 months (applicant &lt; 40 years)</td>
</tr>
<tr>
<td></td>
<td>3 months (applicant +/&gt; 40 years)</td>
</tr>
<tr>
<td>Fasting blood lipids/glucose estimations</td>
<td>6 months</td>
</tr>
<tr>
<td>Ophthalmology reports</td>
<td>6 months</td>
</tr>
</tbody>
</table>

If any results are abnormal or equivocal, repeat studies will be required.

Q. When an applicant has had a clinically-indicated test or consultation independently some time before an equivalent CASA-required examination etc, under what circumstances will CASA accept such an examination in lieu of its own requirement?

A. CASA will deal with each such case on its individual merits. DAMEs and other medical practitioners involved in an applicant’s case management are encouraged to contact medical staff at CASA’s Aviation Medicine Section to discuss individual requirements.
Q. What are CASA’s requirements for medical certification of NZ-qualified pilots who are granted equivalent Australian medical certificates under the terms of the Trans Tasman Mutual Recognition Act (TTMRA)?

A. The TTMRA and the reciprocal NZ legislation apply only to professional licence holders, so effectively concern only Class 1 licence holders. The legislation is completely silent on the issue of medical certification, so CASA and CAA NZ have agreed to deal identically, as follows, with affected pilots whose initial qualifications were gained in the other country but who now have a local licence.

The CAA NZ medical certificate used to validate the original (NZ) licence may be used to validate the newly issued Australian licence until expiry of the NZ medical certificate. (For a class 1 medical certificate, this may permit a validity period of up to 12 months). The relevant authority for this is CAR 5.04 (2).

The licence holder is required to carry the CAA NZ medical certificate when exercising the privileges of the newly issued Australian licence, and also to observe any conditions set out on that medical certificate or in an accompanying letter issued by CAA NZ.

On expiry of the CAA NZ medical certificate, the holder of the licence granted under TTMRA is required to undergo a full CASA ‘Original’ Class 1 medical assessment, including ophthalmology report, audiometry, fasting blood lipid and glucose estimations and resting ECG. As for other Class 1 applicants, a stress ECG should be arranged if indicated. Thereafter, these licence holders will be required to meet identical requirements to all other Class 1 medical certificate holders, including the usual suite of periodically required screening tests.

Q. For how long after blood donation should licence holders/applicants who donate blood refrain from exercising the privileges of an aviation licence?

A. CASA recommends that holders of all classes of medical certificates should usually refrain from exercising privileges of any aviation licence for at least 24 hours after a routine blood donation. In other or unusual circumstances, consultation with a DAME or contact with CASA Aviation Medicine Section is advisable before resuming exercise of privileges.
2. Medical Aspects

2.1 Ophthalmology

2.1.1 Overview

Visual cues provide the pilot's most important sensory input. Good visual acuity over all working distances is essential for safe operation of an aircraft. Information should be sought about the range of visual performance required of each pilot so that relevant advice may be given about suitable correction, if required, and about protection against glare.

If there is any doubt whether a pilot meets the required visual standard, referral to a CASA Designated Aviation Ophthalmologist (DAO) or Designated Aviation Eye Examiner (DAEE) for a detailed assessment and report is mandatory. A standard form has been developed for routine ophthalmological examination required for professional aircrew and ATCs (see also 6. Aviation Medicine Forms). Original examinations must be undertaken by a DAO or DAEE.

Visual Requirements Standard – CASR Part 67

CASR 67.150 For medical standard 1
Table 67.150
1.31 – 1.39

CASR 67.155 For medical standard 2
Table 67.155
2.31 – 2.39

CASR 67.160 For medical standard 3
Table 67.160
3.29 – 3.37
2.1.2 General Visual Requirements

The Medical Standards in the Civil Aviation Safety Regulations (CASRs) stipulate that the functions of the eyes and their adnexae shall be normal. This requirement encompasses more than simply visual acuity. All Designated Aviation Medical Examiners (DAMEs) and Designated Aviation Ophthalmologists (DAOs) and Designated Aviation Eye Examiners (DAEEs) must satisfy themselves that this criterion has been fulfilled before assessing a pilot as meeting the required visual standard.

All applicants for initial issue of a Class 1 and/or 3 Certificate must be seen by a DAO or DAEE. All applicants for issue of a Class 1 and/or 3 Certificate must be seen by a DAO or DAEE at the time of first renewal of medical certificate after reaching the age of 60 years and at two-yearly intervals thereafter.

2.1.3 Refractive Error

Some degree of refractive error is found in the majority of eyes. Most of these errors are simple and are due to a slight lack of coordination of development of the various parts of the refractive system. They represent, therefore, a biological variation from the norm and should not be regarded as pathological.

Pathological refractive errors are relatively uncommon. They are due to gross developmental abnormality. The degree of error is usually high and the visual acuity is often not fully correctable while, particularly in myopia, the eye may show degenerative changes.

At birth, the majority of eyes are hypermetropic. From then until the age of eight years, this hypermetropia is seen to increase. After age eight, refraction becomes less hypermetropic (or more myopic) until approximately the age of 25 to 30 years, when relative stability is reached.
If, therefore, a young applicant has had less than the average degree of hypermetropia at birth, the natural shift to the more myopic side can result in the development of overt myopia, a development that is likely to progress until the age of 25 to 30 years, when some degree of stability is reached.

It is difficult to give an accurate prognosis of the progress of refractive errors since individuals do not necessarily conform to the population norm, and those who develop frank myopia frequently progress to the myopic side more rapidly than those who remain on the hypermetropic side of the population norm.

CASA has not placed restrictions on applicants who require high levels of correction in order to meet the required visual standards. CASA considers that ability to meet the standard is all that is required, regardless of the power of corrective lenses necessary to achieve this outcome.
2.1.4 Refractive Surgery

**Radial Keratotomy (RK)**

The role of radial keratotomy in reducing refractive errors is a significant current issue in aviation medicine. Persons who have undergone this procedure are often subject to diurnal fluctuation in visual acuity. If this is significant, (i.e. loss of more than one Snellen line for professional licence applicants and more than two Snellen lines for private licence applicants) **even if an applicant’s visual acuity is still within the pass standard**, this fluctuation constitutes failure to meet the visual requirements of the standard(s) concerned.

Applicants who undergo radial keratotomy before their myopia has stabilised are at risk of continuing progression of their myopia.

The long-term consequences of radial keratotomy are not yet well documented, so it is impossible to predict any long-term implications for pilot licensing. Applicants should be reminded of this uncertainty as it may affect their chances of employment in the aviation industry.

Following radial keratotomy, the refraction takes some time to stabilise to its new value. Flying is not permitted while the refraction is still plastic. Evidence of stability requires:

- A variation not exceeding 0.25 dioptres in refraction
- A visual acuity changing by not more than one Snellen line
- Visual acuity, which at least satisfies the minimum standard for the class of licence, at three paired serial measurements.

These three paired serial measurements are to be part of a full ophthalmological examination, are to include measurements early in the morning and late in the day, and must be delayed for at least three months following surgery. Note that some eyes may not have stabilised even as late as a year after surgery.

A second problem associated with radial keratotomy is sensitivity to glare. This can cause considerable difficulty in the healing phase but tends to settle with time. Testing of visual performance with a bright light shining at the applicant should demonstrate any continuing glare sensitivity.

All applicants whose eyes have stabilised following radial keratotomy must thereafter have an ophthalmological assessment every two years for Class 1 and 3 and every five years for Class 2 Medical Certificates.
**2. Medical Aspects**

**2.1 Ophthalmology**

**Photo-ablative Refractive Keratectomy (PRK)**

This is a new technique, using a laser, for changing refraction. The long-term implications are as yet unknown. The requirements for assessing stability after radial keratectomy outlined above should be followed after photo-ablative refractive keratectomy.

**2.1.5 Monocular Pilots**

Monocular pilots may be divided into two categories:

- The monocular condition—the situation in which an applicant has only one functioning eye.
- The functionally monocular condition—the situation in which an applicant has two eyes, but the visual acuity of one cannot be corrected to 6/9 or better.

Provided the visual acuity requirements can be met in the functioning eye, with or without correction, a waiver is granted for Class 2 certification, limited to Australian Airspace, for both the monocular condition and for functionally monocular pilots. Likely Conditions on an applicant’s Medical Certificate are:

- Not valid for mustering or agricultural flying.
- Valid in Australian airspace only.
- Special conditions apply.

Functionally monocular pilots who can meet the visual acuity standard with the remaining eye may obtain Class 1 certification. These applicants are required to show that flight safety is not jeopardised by the reduced visual acuity or absence of the other eye. Only the Aviation Medicine Section can issue this waiver. Likely Conditions on the resulting Medical Certificates are as set out above for Class 2 Medical Certificates.
2.1.6 Visual Acuity

**Distant Vision**

Record the uncorrected distant visual acuity in each eye separately, also binocular acuity. If the applicant wears correcting lenses, record the corrected acuity also for each eye and binocularly. For original examinations, check visual acuity without contact lenses and then with contact lenses. Acceptable values are as follows.

**Student and Private Pilots**

For students and private pilots, acceptable values are at least 6/12, corrected if necessary, in each eye. An acuity of at least 6/9 (with or without correction) with both eyes open is also required.

If the student or private pilot applicant cannot achieve 6/12 (with or without correction) in each eye, the DAME should inquire about the defective eye and record the cause.

In cases of doubt, referral to a CASA Designated Aviation Ophthalmologist or prescribing optician is indicated. These applicants may be acceptable for non-commercial licences; however, their licences will carry endorsements restricting operations to Australia.

By definition, if an applicant achieves no better than 6/12 in the poorer eye, the applicant is considered to be functionally monocular.

Applicants assessed as suitable for licensing with appropriate endorsements are required to have a stable visual condition to which they have adjusted. This provision affects pilots who have poor foveal static visual acuity but whose peripheral vision is normal (in practice, amblyopia). Those who have completely lost an eye or its vision may be assessed as fit after the Aviation Medicine Section’s consideration of such factors as the extent of visual field loss and the duration of the condition.

**Professional Flight Crew and ATCs**

For all professional flight crew and ATCs: 6/9, corrected if necessary, in each eye separately. Additionally, the acuity must be 6/6 or better when tested with both eyes open.

Applicants with high refractive corrections (i.e. greater than +/-5 dioptres) should be advised of the possible complications, which may affect their vision, and of the implications for their aviation careers, particularly their increased statistical chance of retinal detachment.

**Note**  The equivalent spherical error is taken as the sum of sphere power plus half that of the cylinder, the calculation taking account of arithmetical signs.
The High Myope

CASA prescribes no limit and high myopes who meet the standard after correction are assessed as meeting the standard. The final decision in cases of high myopia depends on the applicant’s functional visual ability and on the absence of significant ocular pathology.

Although high-density lens material has enabled the lenses in corrective spectacles for applicants with high myopia to be thinner and so not cause unacceptable peripheral distortion, contact lenses are the preferred method of visual correction for myopes who require more than 5 dioptres of correction.

Near Vision

Near vision at all ages must meet the standards specified in the CAR Schedule (N5 with or without correction at 30-50cm and N14 at one metre without correction). DAMEs must check this function at every periodic medical examination for all applicants for aviation licensing.

Professional flight crew should be advised to have periodic ophthalmological examinations from age 45 to detect early signs of developing ocular pathology.

If an applicant cannot meet the standard, he or she should be referred for an ophthalmological assessment and appropriate spectacles prescription.

Near-vision spectacles have a limited range of clear vision, which depends on the power of the lenses prescribed and on the residual accommodation of the wearer.

It is vitally important that the range of clear vision encompasses all the near objects that need to be seen clearly. Typically this ranges from the reading of maps and operating manuals at ordinary reading distance to reading the more distant parts of the instrument display at a distance of one metre or more.

It is important that the spectacles prescribed are suited to the near working distances imposed on the pilot by the configuration of the flight deck of the aircraft. This becomes increasingly critical as an applicant’s presbyopia progresses with age.

The pilot should measure the working distances encountered in all seating positions on the flight deck, and record them prior to having a prescription for near vision determined. A suggested checklist for pilots is as follows.
2.1.7 Working Distances Checklist

<table>
<thead>
<tr>
<th>Object</th>
<th>Nearest (cm)</th>
<th>Farthest (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flight instruments</td>
<td></td>
<td></td>
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<tr>
<td>Engine instruments</td>
<td></td>
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<tr>
<td>Checklists</td>
<td></td>
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<tr>
<td>Electronic Flight Instrument Systems</td>
<td></td>
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<tr>
<td>(EFIS) and flight management display</td>
<td></td>
<td></td>
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<tr>
<td>Approach charts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General charts and manuals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Overhead Panels**

Overhead panels can cause difficulty because of their close proximity to the pilot’s eyes. This proximity ensures that the presbyopic pilot has difficulty seeing legends and numerals clearly, yet in order to view through the near segment of bifocals or through look-overs it is necessary to tilt the head back awkwardly. This may present particular difficulty in some aircraft types.

Possible solutions to difficulty in viewing overhead panels:

- The simplest solution is to lift the bifocals (or look-overs) so that the head does not have to be tilted so far back.

- Flip-down spectacles can be provided with an additional lens power to focus the overhead panel clearly when viewing through the upper distance part of the bifocal lens.

  However, flip-downs are cumbersome and there is a risk that they may be left down, causing blurring of distance vision. There is also a risk that they may flip down inadvertently as a result of turbulence during some critical phase of flight.

- There are vocational multifocals available which have a near segment in the upper part of the lenses as well as in the lower part. However, the distance portion between the two segments is only 12 or 15mm deep giving a distant vertical field of view of only 21 to 26 degrees. Pilots may find this impedes their visual scanning.

- A special multifocal lens can be constructed to provide a small near viewing segment in one corner of the upper part of the lens.
The more complex solution should usually only be pursued if pilots experience significant and persistent problems with the overhead panel. The overhead panel usually does not demand perfect visual acuity and is not often used in critical phases of flight, so it should not be assumed that it presents serious operational difficulties.
2.1.8 Bifocal Segment Height

The height can be set so that the pilot views the instrument panel through the near segment as well as using it for charts and manuals at an ordinary reading distance.

Alternatively the segment can be set low so that it is used only for charts, manuals and reading. When viewing the instrument panel the pilot will look over the top of the near segment to use the distance part of the bifocal.

This choice will depend on:

- Whether or not the pilot is having any difficulty reading instruments on the forward instrument panel; and
- The pilot’s residual accommodation. (At least 2.75 to 3.50D of accommodation is required to see the instrument panel clearly and comfortably through the distance part of the bifocals.)

If the segment is set low, the bifocals may not be suitable for everyday reading outside the aircraft. A separate pair of reading glasses of bifocals for everyday use may then be required.

How to Determine the Correct Segment Height

Optometrists and spectacle dispensers are skilled at setting the segment height correctly, but flying is a demanding occupation and it is worth taking pains to obtain an accurate prescription for the height of the near segment.

It is worth checking segment height on chosen frames or single lens distant vision glasses by stretching adhesive tape across the frame or lens whilst the pilot is seated in the cockpit. The position of the tape can be varied until its upper edge is at the height desired for the top of the near vision segment.
2.1.9 **The Need for Trifocals**

As presbyopia advances, the power of the near spectacle correction must be increased to compensate for further loss of accommodation power. As a result, the range of clear vision decreases.

For a pilot aged about 45 with 3.50D of residual accommodation, the power of the near addition typically prescribed is 1.00D. For this person, the range of clear vision is from two metres to 220mm, which should be more than adequate for all flight deck near-vision tasks. However, a pilot aged 50 to 55 with only 1.50D of residual accommodation is typically prescribed a near addition of 1.75D, giving a very much smaller range of clear vision from 800mm to 360mm. This range is suitable for near tasks at ordinary reading distances but does not permit clear vision of those parts of the instrument panel beyond 800mm.

When this occurs, trifocals are required. Trifocals provide an intermediate segment that has approximately half the power of the lower near segment.

2.1.10 **Acceptable Forms of Correction**

To comply with operational requirements, reading correction must be in the form of ‘look-overs’, bifocal or trifocal lenses as appropriate. Single vision lenses for near correction are not acceptable. See the diagram below.

![Diagram of Bifocal Lens, Look-over Lens, and Single Vision Lens]

- **Bifocal Lens**: For reading
- **Look-over Lens**: For reading
- **Single Vision Lens**: Whole lens for reading **NOT** suitable for flying
2.1.11 Progressive Power Lenses

These lenses provide a variable focus depending on which part of the lens is used for viewing. They provide a narrow intermediate visual channel and larger distant and near areas. These lenses may be associated with illusions of movement and distortion in the peripheral field of view. They should only be used for flying after adaptation in flight as a non-critical crewmember.

2.1.12 Contact Lenses

Provided the following criteria are met, contact lenses may be worn for correction of distance vision.

Both hard and soft contact acuity lenses are acceptable. The pilot must be able to wear the lenses throughout an ordinary day without experiencing any discomfort or deterioration of vision.

An acuity of 6/9 in each eye is required with correcting spectacles immediately after removal or displacement of contact lenses.

The pilot and the prescriber are responsible for ensuring that the pilot has adapted to the contact lenses sufficiently to perform his or her aviation duties. The duty period depends on the type of operations in which the pilot is engaged. The length of time that contact lenses can be worn without producing discomfort differs for private/pleasure flying and long haul commercial operations.

The choice of lens depends upon the nature of the correction required and on cabin conditions encountered.

Hard lenses tend to induce more discomfort and can be displaced by propeller wash or strong wind. Should a pilot need to remove the lenses in flight and substitute spectacles, post-wearing blur with decreased visual acuity should be anticipated.

Soft lenses do not cause those problems to the same extent. However, they may not fully correct astigmatism of greater than one dioptre.

For high myopes, soft contact lenses are preferable to spectacles. In the greatest degrees of myopia, the required visual acuity standards may not be able to be met using spectacles.

For initial issue examination, the contact lenses should be removed and the applicant’s visual acuity checked while wearing spectacles. The uncorrected vision should also be recorded. At renewal medical examinations it is not necessary for the applicant to remove the contact lenses unless the examiner considers this clinically indicated.
2.1.13 Sunglasses

Glare is often a cause of significant discomfort when flying above cloud or when flying into the sun. Sunglasses may be required in such circumstances.

There are two basic factors to consider when selecting sunglasses, namely the frame and the lenses.

Any spectacle frame reduces the field of vision. Narrow frames that carry large lenses are desirable. The most critical problem with frames arises from the presence of wide side-arms which significantly impair the peripheral visual field.

Sunglass lenses should protect the eyes from glare while not adversely affecting the visual cues necessary for safe flight. Accordingly, lenses should not be too dark, and should transmit at least 15% of incident light. The tint used should be "neutral density" (N.D.), that is, a greyish tint that does not distort colour perception or adversely affect red signal detection and recognition. The recommended tint is N.D.15.

Lenses of polycarbonate are preferred because of their impact-resistance and ability to absorb ultra-violet and infrared rays. However, these lenses can scratch readily and any scratched spectacles should be discarded.

To ensure that sunglasses provide adequate protection from solar radiation that may damage the eyes, only those sunglasses that conform to the current Australian Standard should be worn.

Sunglasses that conform to the current Australian Standard also meet acceptable standards for lens quality, frame strength and lens retention.

For aviation use, those sunglasses marked "Specific Purpose Sunglasses" are recommended, provided their frames are appropriate. The lenses of these sunglasses have been specifically designed for use in conditions of intense glare, such as in flight above cloud. At high altitude, atmospheric absorption of ultra-violet radiation is reduced.

Polarising sunglasses should not be used when flying. The polarising filter interacts with the cockpit transparency to produce a distorted and degraded visual field that poses a threat to air safety.

The pilot who already wears prescription spectacles for flying can choose from a number of options for glare protection. Prescription sunglasses with N.D.15 lenses can be obtained, or N.D.15 clip-on or flip-up sunglasses may be worn over prescription spectacles.

Pilots who require correction of their near vision only and who wear "look-overs" are advised to obtain bifocals and a plano upper segment. Clip-on or flip-up sunglasses can then be worn. However, the dangers of flip-ups previously mentioned should be recalled.
Graduated lens tint is another option. This provides glare protection for distant vision outside the aircraft, while near vision inside the aircraft is not impeded by the tint. It is usually considered that the use of a single tinted segment in bifocal glasses should be avoided as the visual effect of a "false horizon" may be disturbing and dangerous.

2.1.14 Photochromics

Spectacles can also be prescribed with photochromic lenses — lenses that change their density depending on the ambient light level. Under bright conditions they are like sunglasses, while in darker conditions they transmit light almost as well as untinted lenses. However, photochromic lenses have disadvantages that render them unsuitable for use by pilots.

Firstly, their transition times are relatively slow. Photochromic lenses take about five minutes to increase their density to the level of sunglasses, but more importantly, the bleaching time from maximum to minimum density can be as long as 30 minutes or more, although there is a rapid lightening of the lens in the first five minutes. This may be too long when there is a sudden variation in light during a descent into or under cloud, or because of a rapid change in cloud cover.

Their second disadvantage is that, even when fully bleached, photochromic lenses still absorb slightly more light than untinted lenses. Since vision is critically dependent on ambient light levels at night or otherwise when light levels are low, even this small decrease of light reaching the eye through photochromic lenses is undesirable. The inherent degradation of these lenses with time effectively prohibits their use in flying or controlling air traffic and applicants should not use them in these circumstances.
2.1.15 Colour Vision

Normal colour perception is becoming increasingly important as colour-coded cathode ray tube displays and colour coded visual approach lights become more prevalent. If any element of doubt exists about a pilot's ability to perceive colour normally, the case should be referred to the Aviation Medicine Section.

Commoner Types of Colour Vision Defects

<table>
<thead>
<tr>
<th>Type (Incidence)</th>
<th>Essential Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protanomaly (1.0%)</td>
<td>Colour matches are different from those made by normals (anomalous colour matching). Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Extreme protanomaly (0.2%)</td>
<td>Reduced colour discrimination for red, yellow and green. Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Protanopia (1.0%)</td>
<td>Confusion of red, yellow and green. Reduced sensitivity for red lights.</td>
</tr>
<tr>
<td>Deuteranomaly (4.5%)</td>
<td>Colour matches different from those made by normals.</td>
</tr>
<tr>
<td>Extreme deuteranomaly (0.5%)</td>
<td>Reduced colour discrimination for red, yellow and green.</td>
</tr>
<tr>
<td>Deuteranopia (1.5%)</td>
<td>Confusion of red, yellow and green.</td>
</tr>
</tbody>
</table>

Test Procedure

The DAME is required to conduct a colour perception test, using the Ishihara 24-plate test. This test should be conducted even if the applicant is to be referred to an ophthalmologist. If the applicant should incorrectly identify more than two of the Ishihara plates, a test on a Farnsworth lantern is needed to determine whether or not he or she meets the colour perception standard.

The Ishihara plates test should detect all red/green colour vision defectives. Examiners should be aware, however, that some applicants may have learned the plates, and their presentation in random order is important. Other applicants have been trained to identify numbers on the plates by means of brightness cues or may even attempt to pass the plate tests by wearing an X-chrom or similar lens—a red contact lens worn in one eye which improves the colour defective's performance on the test.
Plate Testing

Reliable colour vision testing using the pseudoisochromatic plates requires that a standardised procedure be followed carefully. The main points are:

Illumination

Only the following are permitted:

- Daylight (but not direct sunlight). This is preferred.
- Fluorescent light from a fluorescent tube of 6,500 degree K colour temperature (normal daylight tubes).
- Phillips ‘Bleu’ incandescent lamp.
- Macbeth Colour Source C.
- Where an applicant is unable to pass the test when it is performed under artificial lighting conditions, it should be repeated in daylight before a failure is recorded. However, this additional test is not required where an applicant makes more than 12 errors or gives a history of known defective colour vision.

**Note** Before using fluorescent light, check the maker's label on the end of the tube to ensure the colour temperature is that specified. Tubes labelled "warm white" or "soft white" are not suitable.

Position

The applicant may stand or be seated, but should look squarely at the test plates from about 75cm distance. The applicant’s position should be adjusted so that no specular reflection from the glossy surface of the plates is observed. The applicant should not move his or her head while taking the test.

Exposure Time

Each plate is exposed for a maximum of five seconds.

Procedure In Detail

1. Check the applicant's position, illumination, watch or clock with second hand.
2. Open the book at the first (demonstration) plate.
3. Read out at conversational speed, pausing perceptibly where indicated.
   “I am going to show you some pages of dots. On some of them you can see a number, but some have no number. I want you to tell me if you can see a number and what it is. (Pause.)
   If you can't see a number, say "no number". You have up to five seconds for each page. (Pause)
   Is that clear?"

4. Now expose each test plate in random sequence.

5. When the applicant responds, or after five seconds have elapsed, whichever is sooner, turn to the next plate. Most applicants respond almost at once.

6. If more than one response is given to a plate, eg, "It's either three or eight", say "which one are you going to choose?" If the applicant changes his or her response, record the second response.

Marking Standard

Applicants scoring two errors or less on the 24-plate edition of the Ishihara plates meet the required standard. Those making three or more errors need to be tested on the Farnsworth Lantern.

Note: If the DAME suspects that a filter aid is being used, each of the applicant’s eyes is to be tested separately and then binocularly. The results are to be notified to the Aviation Medicine Section.

Further Testing

Some applicants with defective colour vision may be safe for aviation duties, e.g. mild deuteranomals. The Farnsworth Lantern passes these while failing all protanopes and deuteranopes and most protanomals and the more severe deuteranomals.

The Australian locations of Farnsworth Lanterns are listed in 5. Colour Vision Testing. Farnsworth Lanterns are not transported to outlying areas. Examiners should refer applicants who fail the plate test directly to the nominated centres for Lantern testing. Such referrals should be noted on the examination form. If there is no record of such referral on the form, the Aviation Medicine Section notifies applicants of their right to undergo further testing.

Note: Applicants for original class 3 medical certification must pass the Ishihara Plate Test.
An applicant who fails to meet the colour perception standard (i.e. who fails both the Ishihara Plate Test and the Farnsworth Lantern, but who meets all other standards) is eligible for issue of an operationally restricted student pilot, private pilot or commercial pilot licence. The holder of such a licence is given a dispensation to operate at night in a suitably radio-equipped aircraft. This dispensation applies to Australian airspace only.

Class 1 and class 2 applicants who are unable to pass either the Ishihara Plate Test or Farnsworth Lantern Test may be further assessed by means of Practical Signal Light Test. Details are available from Aviation Medicine Section.

2.1.16 Cataract

Applicants who have undergone cataract extraction(s) and who achieve acceptable visual acuity with lens implant and/or contact lenses may be passed at all licence levels following individual assessment by the Aviation Medicine Section. Full reports are required.

All other cases of cataract should be referred to an ophthalmologist. A report including assessment and prognosis is required. The final decision in these cases is based on the ophthalmology report.
2.1.17 Demyelinating Disease

Multiple Sclerosis (MS) is a central demyelinating disease involving multifocal demyelination of white matter, which initially affects young people under 40 years of age. The diagnosis requires multiple attacks of demyelination separated in time and locations. A thorough neurological history is important at the time of presentation. Nuclear magnetic resonance imaging (MRI) offers some help in diagnosis but should not be substituted for good history taking.

The most common ocular manifestation of MS is optic neuritis. It is the presenting feature in 25% of cases and occurs during the course of established disease in 70%. Between 50% and 70% of patients in the 20-40 year age group presenting with optic neuritis subsequently develop systemic demyelination.

Optic neuritis typically presents as sudden unilateral blurred vision progressing over a few days. The vision is often described as being "washed out"; colours appear desaturated and there is often associated retro/peri-ocular pain aggravated by eye movements.

Signs include reduced acuity of variable severity from minimal to "no perception of light"; an afferent pupillary defect (pupil dilates during the "swinging light" test); and dyschromatopsia (poor colour discrimination performance).

The most common visual field defect is a central scotoma. Ophthalmoscopy may reveal a swollen optic disc although the disc is often normal in the retrobulbar type of MS. Optic atrophy (associated with previous attacks) may be found in the ipsi- or contra-lateral eye.

Visual recovery is slower than the initial loss and usually takes between four to six weeks. About 90% of sufferers recover normal visual acuity. Minor defects in colour vision and brightness appreciation may persist. The effects of subsequent attacks are additive. There is no correlation between the degree of visual defect during the attack and the final visual outcome.

All pilots with optic neuritis should be referred to a Designated Aviation Ophthalmologist. Examinations should include visual field plots of both eyes. A typical case may require CT and MRI scanning to rule out compression of optic nerves or chiasma.

Sinister features in applicants with MS include failure of visual recovery after four weeks, persistent periorcular pain, proptosis, development of a quadrantic or hemianopic visual field defect, and field defect in the contralateral eye. All cases with severe visual acuity loss (<6/60) should be further investigated.

Flying duties in between infrequent attacks are possible provided there is adequate neurological and visual function monitoring. All cases should be referred to the Aviation Medicine Section for final assessment after adequate work up.
2.1.18 Glaucoma

All applicants for flight crew licensing who have glaucoma, or whom the DAME suspects may have glaucoma, must be assessed by a Designated Aviation Ophthalmologist. The DAME should not revalidate their Medical Certificates.

**Primary Glaucoma**

**Closed Angle Glaucoma**

Applicants should not be passed until the condition has been surgically corrected. Once corrected, a pass assessment may be issued after ophthalmological review.

**Open Angle Glaucoma**

Most open angle glaucoma is controlled by medication. The Aviation Medicine Section may issue a pass assessment only after receipt of a satisfactory ophthalmologist's report, which must include results of perimetry.

Preferred treatment is with beta-blocker drops. However, applicants with glaucoma controlled by other means are assessed individually.

Open angle glaucoma that has been successfully treated by microsurgical or laser techniques may be assessed as meeting the required standard by the Aviation Medicine Section.

Open angle glaucoma controlled with drugs requires annual ophthalmological review, including perimetry.

**Secondary Glaucoma**

Medical assessment depends on the underlying disease and the effectiveness of control. All cases should be referred to a Designated Aviation Ophthalmologist.
2.1.19 Macular Disease

The symptoms of macular disease include blurring and distortion of vision with micropsia or macropsia, which can be assessed with an Amsler grid. (This consists of a piece of paper showing a 10cm square divided into 5mm squares with a central fixation dot).

The subject is asked to fixate on the central dot, with each eye separately, at one third of a metre and to mark on the chart with a pencil, scotomata or areas of distortion.

When abnormalities are present, immediate referral to a Designated Aviation Ophthalmologist is required.

The commonest conditions affecting the macula are Central Serous Retinopathy and Disciform Macular Degeneration. All cases require final assessment by the Aviation Medicine Section.

Central Serous Retinopathy

The condition affects healthy young men with a hectic lifestyle. Only one eye is usually affected and reduction of acuity is mild (6/12 or 6/18). With a direct ophthalmoscope, dulling of the macular reflex is seen, representing a shallow central retinal detachment.

Vision recovers spontaneously within six weeks in 90% of cases. Stereoaucuity is temporarily lost and pilots should not fly until full recovery occurs. Laser treatment has been shown to speed the resolution of symptoms, but does not improve the final visual outcome, and no treatment is usually advised. The condition recurs in 20 to 30% of cases and the second eye is affected in 20%.

Macular Degeneration

This condition typically affects the elderly but inherited forms may affect younger people. Ophthalmoscopy may show small grey, yellow or white lesions, like small crystals, at the macula. These are called "drusen" (German, druse = nodule).

The visual acuity is usually well preserved, 6/9 or 6/12, until a further complication occurs — the development of a subretinal neovascular membrane that spreads under the macula and reduces vision to 6/60 or less.

To prevent the visual acuity from deteriorating below standard, regular follow-up is essential. In the early stages when the vision is distorted, but the acuity well preserved, the subretinal membrane can be obliterated by argon laser treatment.
2.1.20 Retinal Detachment

This may occur at any age although it is commoner in the elderly. Myopic people, particularly high myopes, are at increased risk. Advice on the long-term prospect of an aviation career should be given to those with high myopic refractive errors.

The most frequent type of retinal detachment follows collapse of the vitreous gel — Posterior Vitreous Detachment. The symptoms are a sudden shower of floaters (caused by vitreous haemorrhage or pigment release) and flashing lights, due to vitreous traction on the retina. Urgent referral to an ophthalmologist is mandatory to exclude the presence of a retinal tear.

At the stage when the retina is torn, but not yet detached, laser treatment may be used to seal the retinal tear before fluid from the vitreous cavity passes through it to detach the retina. Once the retina begins to detach, prompt surgery is necessary. If surgery can be undertaken before the retina detaches from the macula, the prognosis for maintained vision is excellent. Once the macula has been detached for more than a few hours, visual recovery is only partial.

A special form of retinal detachment, retinal dialysis, is the commonest type of detachment seen in young, otherwise healthy people who are not myopic. It may occur after a blunt injury, which causes a tear in the extreme periphery of the retina.

Intraocular gases are often injected into the vitreous cavity during retinal detachment surgery. The most commonly used gases are air, sulphur hexafluoride (SF6) and perfluoropropane (C3F8). Air takes only three or four days to be resorbed whereas the longest acting gas, C3F8, persists for up to six weeks. Air travel should be avoided until the gas bubble resorbs. Bearing in mind even in pressurised aircraft cabin altitude can be up to 8,000ft; a dangerous rise in intraocular pressure can occur if this precaution is overlooked.

In all cases of retinal detachment, once the condition is stabilised, a computerised visual field plot is mandatory before considering the applicant for return to pilot duties. The pilot should retain a copy of the plot for future comparison. The Aviation Medicine Section assesses each case individually.

2.1.21 Retinal Injuries

If a severe injury to the eye has occurred, with definite or suspected perforation of the globe, any aerial transport should be conducted at a cabin altitude of 4,000ft or less.
2.1.22 Strabismus

Whereas some degree of heterophoria is the norm, heterotropia (i.e. a manifest deviation of one eye from its normal position which occurs despite both eyes being open and uncovered), requires assessment by a Designated Aviation Ophthalmologist and final assessment, on an individual basis, by the Aviation Medicine Section. An applicant with an acuity (corrected or uncorrected) of worse than 6/12 is unacceptable, and a binocular acuity of worse than 6/9 is also unacceptable.

A majority of squint sufferers who have excellent cosmetic results from surgery and good visual acuity in each eye may still lack normal stereopsis (depth perception). They develop distance judgement by monocular cues and these are usually superior to those available to applicants who have lost an eye. However, their fine distance judgement for near distances is inferior to those with normal binocular vision. The Aviation Medicine Section individually assesses persons lacking binocular vision.

Squint may be latent or manifest. A latent squint is likely to become manifest under the influence of such factors as illness, fatigue, stress, drugs or alcohol. A cover test alternately on each eye unmasks latent squint.

The tests described below are designed to detect those who lack binocular vision.

**Cover Test**

Test at near (30cm) and at six metres. Use an accommodation fixation target at both distances. (For near an N5-size print and for distance a 6/12 letter). Ask subject to look at the fixation target, cover one eye and observe the other eye for refixation movement. Repeat test procedure for the other eye. Any refixation movement indicates possible squint.

**Lang Stereo Test**

Test at near (30cm). Hold card still and ask subject to name any pictures seen. Pass is three pictures: cat, star and car. A new Lang stereo test that tests to 200 degrees of arc is available. This may be considered superior to the standard Lang test that tests to 55 degrees of arc.

**Worth Four Dot Test**

Subject wears red/green goggles. Pass is identifying four lights, one red, two green and one white. Test at six metres only. Those who fail can undergo further tests, for example six-metre vectograph or Bagolini lens test to confirm if they truly lack binocular vision.
2.2 Cardiology

2.2.1 Introduction

This section details the requirements for cardiological assessment of an aircrew member or air traffic controller and provides guidance on the aeromedical disposition of pilots and cardiovascular disease.

The aim of the examination is to ensure that the applicant does not suffer from any cardiovascular condition which carries an increased risk of incapacitation or which produces a decrement of physiological functional reserve that may jeopardise operational safety.

The DAME should recognise that an individual with an unrestricted Medical Certificate must be capable of performing all of the activities that are possible under the licence held.

These activities could include:

- Aerobatics, with the possibility of high G forces being encountered
- Operations in extremes of temperature for long periods
- Operations at altitudes where the partial pressure of atmospheric oxygen is decreased to two-thirds that which exists at sea level.

2.2.2 The Cardiovascular Standard – CASR Part 67

CASR 67 The cardiovascular standards are found in the following paragraphs of CASR Part 67:

<table>
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<th>For medical standard 1</th>
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<td>3.9 – 3.11</td>
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2.2.3 Assessment

The DAME should note relevant risk factors for ischaemic heart disease in assessing an individual’s cardiovascular system. The risk factors to be considered are:

- Age
- Total cholesterol (fasting estimation)
- The total cholesterol to HDL cholesterol ratio (fasting estimation)
- Blood glucose (fasting estimation)
- Cigarette smoking
- Systolic blood pressure
- Hypertension
- Diabetes Mellitus
- Obesity
- Lack of regular exercise
- Positive family history of cardiovascular disease.

Obesity—while not a strong independent risk factor for ischaemic heart disease—when present, should be a trigger for more intensive evaluation of risk factors.

An applicant with multiple coronary artery disease risk factors should be considered for more detailed examination such as stress ECG.

Mandatory Cardiovascular Risk Factor Profiling

This is required for all Class 1 applicants in the years when fasting lipids are required.

Risk factor profiling is also required for all diabetic applicants of all classes of certificate at initial assessment after a diagnosis of diabetes has been made and at 5-yearly intervals subsequently.

2. Medical Aspects

2.2 Cardiology

A score should be calculated for the applicant with regard to age, lipid profile, systolic blood pressure, smoking, diabetes and LVH on ECG. At a score of 15 points, the 10-year probability of cardiac events approaches 1% per annum, which is the risk considered acceptable for professional aviators in a multi-crew environment. When the coronary risk score is 15 or above, applicants are required to have stress testing. It is a requirement for points-based stress tests, that the test is read and interpreted by a cardiologist. In situations where it is not feasible to have a cardiologist perform the stress test (eg, geographical access) then the test may be performed by a physician experienced in the performance of stress tests.

The requirements for mandatory 12-lead resting ECGs are detailed in section 1.4.1 Electrocardiographs in 1. Administrative Aspects.

2.2.4 General Principles

The following conditions are statistically associated with reduced functional capacity in cardiac reserve or with unpredictable risk of sudden incapacitation. Applicants with such conditions should therefore be assessed as medically unfit for certification. In individual cases, after thorough assessment, some may be granted Medical Certification.

- Uncontrolled systemic or pulmonary hypertension
- Any structural and/or physiological defect of the heart or circulation which results in regional circulatory ischaemia of a critical circulatory bed, or in ventricular hypertrophy or ventricular dilatation
- Any structural or physiological defect of the heart which results in electrical instability, either dysrhythmia or conduction defects
- A diagnosis of haemodynamically significant aortic stenosis
- Any structural or physiological defect of the heart or lungs which results in veno-arterial shunting and desaturation of arterial blood
- Any structural or physiological defect (and/or its consequences) that require the use of cardiotonic or vasoactive agents for compensation of cardiac reserve and for control.
2.2.5 Hypertension

Uncontrolled hypertension is disqualifying. A systolic pressure of 150 mm Hg and/or diastolic pressure of 90 mm Hg are the upper limits acceptable, but the applicant's age and sex should also be considered. If either or both the systolic and diastolic pressure repeatedly exceed(s) these limits, the applicant's blood pressure is not acceptable, even if on treatment. (These values accord with recommendations of the National Heart Foundation of Australia). Investigations by 24-hour ambulant blood pressure monitoring may assist diagnosis of borderline cases.

Controlled (adequately treated) hypertension is allowable at all levels of licence provided that there is:

- No significant end organ damage
- Satisfactory ECG
- No adverse drug side effects.

Acceptable Medication

Most modern antihypertensive agents are acceptable for control of hypertension in aircrew, provided the applicant is established on the medication and has exhibited no adverse side effects from the drug(s).

The applicant must not pilot any aircraft or actively control air traffic following the commencement of antihypertensive therapy or of a changed treatment regimen until such time as there are no significant side effects from medication and, in any event, not within one week of the commencement of therapy or change in medication. Preferred drugs include diuretics, ACE inhibitors, calcium channel blockers, prazosin angiotensin II antagonists and beta-blockers. Particular care should be taken with use of antihypertensive medications by aerobatic pilots, because of the reduction in G-tolerance produced by these agents.
2.2.6 Ischaemic Heart Disease

Technical Specifications of Investigative Procedures Required in these Protocols

Stress Electrocardiogram

1. Bruce protocol with a 12-lead ECG, with monitoring for at least five (5) minutes after cessation of exercise.

2. Applicant to reach at least 100% of predicted heart rate and at least nine minutes on the Bruce protocol or equivalent on the bicycle ergometer (maximum predicted heart rate = 220 beats per minute minus applicant's age in years for men, 200 beats per minute minus applicant's age in years for women).

3. Treadmill exercise is preferred but bicycle exercise is acceptable if the applicant is unable to perform on the treadmill.

4. Applicant should have been continuously in the time zone where testing is performed for at least 72 hours prior to the test.

5. Applicants should normally cease taking any beta-blocker 48 hours prior to the stress test, unless the medication is used to treat known ischaemic heart disease or a significant arrhythmia.

When a beta-blocker is not so ceased prior to stress testing an applicant, an explanation of the reason is required from the treating or investigating cardiologist who supervises the stress test.

6. All reports of stress tests should include the following details:
   - duration of exercise (with comment if less than nine minutes);
   - level of perceived exhaustion of the applicant; and
   - any symptoms experienced by the applicant.

7. A positive stress electrocardiogram is defined by 1.0 mm or more of horizontal or down sloping ST segment depression at 0.08 sec after the J point.

8. A positive stress ECG is of adequate diagnostic validity if recorded when an applicant's exercise capacity, heart rate and blood pressure responses reach at least 85% of predicted for age, sex, height and weight, and where the ST segment shift is consistent with ischaemia.

Note: A rise of more than 20 mm in systolic blood pressure response is expected. If the applicant returns a positive stress ECG with ST changes before reaching 100% of designated criteria, it is a matter of even greater aeromedical concern. Exercise electrocardiograms are a screening test for the presence of Ischaemic Heart Disease (IHD) but do not provide conclusive evidence of the presence of IHD. Applicants need not refrain from exercising privileges simply because they are required to undertake a stress ECG.
9. If an applicant is unable to reach nine minutes or equivalent on stress ECG then a gated heart pool scan and cardiologist’s opinion may be acceptable alternatives. In these circumstances, the reason for ceasing the test must be stated.

10. In appropriate circumstances (e.g., severe arthritis), pharmacological stress testing may be substituted. This should be discussed with CASA Aviation Medicine Section before it is undertaken.

11. The physician supervising the investigation should report exercise ECGs. Computer reporting of exercise ECGs is not acceptable to CASA. In addition, CASA expects that when a stress test is required for clinical reasons, the cardiologist or physician responsible for the test will clinically evaluate that applicant.

12. Where an applicant has undergone recurrent false positive stress ECGs with ischaemia ruled out by means of a stress nucleotide scan, future stress ECGs may be accepted as normal provided there is no significant change to the ECG findings from year-to-year and the level of exercise in METS remains satisfactory.

**Stress Echocardiogram**

1. To be performed by an experienced laboratory, using standard recognised protocol, because of possible difficulty with interpretation.

2. Aim should be to achieve 100% of predicted heart rate, as for stress electrocardiogram, without developing any symptoms or signs of myocardial ischaemia.

3. For applicants undergoing pharmacological stress echocardiography using sympathomimetic stressors, atropine may be administered following the maximal dose of dobutamine.

4. A positive stress echocardiogram is defined by severe or extensive new wall motion abnormalities, horizontal or down sloping ST segment depression > 1mV at 0.08 seconds after the J point compared with baseline; new ST segment elevation >0.1mV in applicants without a previous myocardial infarction, or significant tachyarrhythmia. Applicants who have a positive stress Echocardiogram should not exercise privileges until their cardiac status is clarified.

5. If an applicant is unable to achieve 100% of predicted heart rate or if the test is terminated for other reasons, the reasons for ceasing the test must be stated.

6. ECG recordings should be carried out contemporaneously during the exercise test, and should be commented upon by the interpreting physician.
Stress Nucleotide (Thallium or Sestimibi) Scan

2. Bruce protocol stress to a minimum of 100% of predicted maximal heart rate and at least nine minutes exercise time.
3. Applicant should have been continuously in the time zone where testing is performed for at least 72 hours prior to the test.
4. Applicant should continue to take his/her usual medication(s) until tested.
5. Re-injection or 24 hour view if defects are present. This additional requirement may be omitted if the defect(s) is/are demonstrated to be non-reversible.
6. A satisfactory exercise nucleotide scan is recorded when the exercise or nucleotide scanning does not reveal defects consistent with myocardial ischaemia. Applicants who have a positive stress radio nucleotide scan should not exercise privileges until their cardiac status is confirmed.
7. ECG recordings should be carried out contemporaneously during the exercise test, and should be commented upon by the interpreting physician.

Coronary Angiogram

1. The angiogram is to demonstrate all major vessels, their tributaries, and grafts if present.
2. Left ventriculogram should be performed.
3. A significant stenosis is considered to be present if there is greater than 50% narrowing of any artery.
4. A satisfactory coronary angiogram is recorded when there is no significant stenosis seen in the native coronary circulation and/or where coronary artery bypass grafts appear without discernible wall pathology or have only minor irregularities.
5. The report should include a diagrammatic representation of the coronary arteries.

Gated Blood Pool Scan

1. Measurement of the ejection fraction gated heart pool scan may be required for uncertain cases where the ejection fraction is borderline or unreliable on stress nucleotide scan or stress echocardiogram.
2. The scan should show an ejection fraction greater than 45%.
Electron Beam Computed Tomography and ‘Calcium Scores’

1. Aviation Medicine is considering the potential use of this technology. However, in common with other regulators, it does not currently accept the results of these investigations as substitutes for any other required tests.

Cardiologist’s Assessment

This is to include recording of:

1. Clinical status.
2. Control of risk factors, including smoking and obesity.
3. Hyperlipidemia, hypertension, or diabetes mellitus.
4. A satisfactory gated heart pool scan, which should demonstrate no wall motion abnormalities associated with moderate hypokinesis.
5. An overall ejection fraction greater than 45%.
6. An acceptable fasting lipid profile, where total cholesterol is less than 5.5 mmol/L and the HDL fraction is greater than 1.0 mmol/L. Note that both HDL and LDL fractions should be recorded.

Cardiologist’s Review

This is to occur at six-monthly intervals and should include recording of:

1. Clinical status.
2. Control of risk factors, including smoking and obesity.
3. Hyperlipidemia, hypertension, or diabetes mellitus.
4. An acceptable fasting lipid profile, where total cholesterol is less than 5.5 mmol/L and the HDL fraction is greater than 1.0 mmol/L. Note that both HDL and LDL fractions should be recorded.

Issue of Aviation Medical Certificate Following Myocardial Infarction

Class 1, 2 or 3 Medical Certificates

Following the infarction, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. This will not be considered until six months after the event.
Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment at six-monthly intervals
- Stress nucleotide scan (preferred) or stress echocardiogram.
- Ejection fraction estimation
- Coronary angiogram, unless this has already been undertaken.

If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction.

Subsequent Reviews

12 months post myocardial infarction:
- Routine aviation medical examination
- Cardiologist’s review every six months
- Stress nucleotide scan (preferred) or stress echocardiogram (refer protocol described under Stress Echocardiogram).

At yearly intervals thereafter:
- Routine aviation medical examination
- Cardiologist’s review every six months
- Stress ECG at yearly intervals.

*Issue of Aviation Medical Certificate Following Coronary Artery Bypass Graft (CABG).*

**Class 1, 2 or 3 Medical Certificates**

Following the graft, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

This will not be considered until six months after the surgery for Class 1, 2 or 3.

Recertification

Investigations required for recertification are:
- Routine aviation medical assessment
- Cardiologist’s assessment
- Stress nucleotide scan
- Ejection fraction estimation.
If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction.

**Subsequent Reviews**

12-month intervals post coronary artery bypass graft:
- Routine aviation medical examination
- Cardiologist’s review every six months
- Stress ECG yearly.

**Note:** Angiography is no longer routinely required every five years, but may be required if an applicant develops new symptoms or other evidence suggesting worsening IHD despite treatment.

**Issue of Aviation Medical Certificate Following Coronary Artery Angioplasty**

**Class 1, 2 and 3 Medical Certificates**

Following angioplasty, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

This will not be considered until six months post angioplasty for all classes. While preliminary data suggested that drug-eluting stents may reduce the incidence of post angioplasty stenosis, more recent studies reveal that drug-eluting stents are associated with an increased risk of late thrombosis. As such, bare metal stents are preferable in the aviation context. CASA is not prepared to reduce the six-month post-treatment period at this time. CASA will continue to monitor this issue.

**Recertification**

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan (preferred) or stress echocardiogram
- Ejection fraction estimation.

If all of the above investigations are satisfactory, the subject may be recertificated for 12 months without restriction at all classes.
Subsequent Reviews

12-month intervals post angioplasty:
- Routine aviation medical examination
- Cardiologist’s review completed six-monthly
- Stress ECG.

Note: Angiography is no longer routinely required every five years, but may be required if an applicant becomes symptomatic or has other evidence suggesting worsening HID despite treatment.

Issue of Aviation Medical Certificate Following Evidence of Ischaemic Heart Disease

Class 1, 2 or 3 Medical Certificates

When an applicant presents with:
- Ischaemic heart disease symptoms such as angina, arrhythmia; or
- Cardiac failure or other evidence of ischaemic heart disease, inform CASA Aviation Medicine Section of the diagnosis and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment conducted six-monthly
- Stress nucleotide scan (preferred) or stress echocardiogram
- Ejection fraction estimation.

If the stress nucleotide scan or stress echocardiogram is positive, the applicant must proceed to an angiogram.

If all investigations up to and including the stress nucleotide scan or stress echocardiogram are negative, the subject may be recertificated.

If the stress nucleotide scan or stress echocardiogram is positive but a subsequent angiogram is reported as satisfactory, the applicant may be recertificated.

Subsequent Reviews

This will depend on individual case assessment.
2.2.7 Valvular Heart Disease

Uncorrected Aortic Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist reports are satisfactory, the applicant may be recertificated for a period of one or two years depending on the severity of the condition and the rate of deterioration.

Subsequent Reviews

At annual or biennial intervals:

- Routine aviation medical examination
- Cardiologist’s review
- Echocardiogram
- ECG.

Corrected Aortic Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA.
Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.

Where a tissue valve is used and there is no requirement for anticoagulation and certification may be unrestricted.

Where a mechanical valve is used, the applicant is to have evidence of clinically satisfactory, well-controlled anticoagulation and Class 1 medical certification will be restricted to multi-crew operations.

Subsequent Reviews

Classes 1, 2 and 3 require yearly review by a cardiologist.

Uncorrected Aortic Stenosis

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Electrocardiogram
- Doppler echocardiogram
- Chest X-ray.
If all of the investigations and the cardiologist’s report are satisfactory, the applicant may be recertificated solo for a period of 12 months, provided the following criteria are met:

- Aortic valve calcification grade 1 or 2
- Valvular Doppler jet velocity <3m/s
- Valve area >1.0cmsq
- Asymptomatic.

**Subsequent Reviews**

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and the cardiologist’s report are satisfactory, the applicant may be recertificated solo for a period of 12 months, provided the following criteria are met:

- Aortic valve calcification grade 1 or 2
- Valvular Doppler jet velocity <3m/s
- Valve area >1.0cmsq
- Asymptomatic.

*Corrected Aortic Stenosis*

**Class 1, 2 and 3 Medical Certificates**

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.
Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Chest X-ray.

If all of the investigations and the cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.

Where a tissue valve is used and there is no requirement for anticoagulation, medical certification may be unrestricted.

Where a mechanical valve is used, the applicant is to have evidence of clinically satisfactory well-controlled anticoagulation, and Class 1 medical certification will be restricted to multi-crew operations.

Subsequent Review

Class 1, 2 and 3 all require annual review by a cardiologist.

Aortic Root Dilatation

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA.

Yearly assessment by echocardiogram is required once the aortic root size reaches 3.8-4.0cm/m$^2$ due to the risk of rupture.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram.

If all of the investigations and the cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months.
Subsequent Review

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram.

Uncorrected Mitral Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram.

If all of the investigations and cardiologist’s reports are satisfactory, the applicant may be recertificated for a period of 12 months without restriction.

Subsequent Reviews

At annual intervals thereafter:
- Routine aviation medical examination
- ECG
- Doppler echocardiogram
- Cardiologist’s review.
Corrected Mitral Incompetence

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Doppler echocardiogram.

If the valve is replaced, a significant risk of embolism may remain, particularly if factors such as poor left ventricular ejection fraction, left atrial dilatation, atrial fibrillation and poor INR control are present.

Cases will be considered on an individual basis. Assessments will not be made until at least six months post surgery.

For valve repairs, if reports are favourable, applicants may initially be recertificated for 12 months.

Subsequent Reviews

Valve Replacements:

For Classes 1, 2 and 3, annual routine aviation medical examination. All applicants require cardiologist’s review with Doppler echocardiogram.

Valve Repairs:

All applicants require a routine annual aviation medical examination and cardiologist’s review with Doppler echocardiogram.
Uncorrected Mitral Stenosis

Class 1, 2 and 3 Medical Certificates

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram.

Applicants with mild uncorrected mitral stenosis (where the valve area is greater than 1.5 cm², the heart is in sinus rhythm, where there is no history of atrial fibrillation and the left atrial diameter is less than 4.5 cm), are permitted recertification for 12 months.

Other applicants will be considered on a case-by-case basis.

Subsequent Reviews

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- ECG.

Corrected Mitral Stenosis

Class 1, 2 and 3 Medical Certificates

Recertification

Investigations required for recertification following mitral valvotomy are:
- Routine aviation medical examination
- Cardiologist’s assessment, which is to include assessments of the incompetence and stenosis
- Doppler echocardiogram
- ECG.

If all of the investigations and cardiologist’s reports are satisfactory following mitral valvotomy, the applicant may be recertificated for a period of 12 months.
Following Mitral Valve Replacement

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results are assessed as satisfactory by CASA. This will not be considered until at least three months following mitral valvotomy or replacement.

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Doppler echocardiogram
- ECG.

Following mitral valve replacement, applicants will be considered on a case-by-case basis on consideration of individual risk factors. Those with significant echocardiographic changes such as LA dilatation or atrial fibrillation may be subject to more stringent restrictions to their certificate.

Subsequent Reviews

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review
- ECG
- Doppler echocardiogram.

Uncorrected Mitral Valve Prolapse

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram.

Applicants will be assessed on a case-by-case basis. Those with mitral valve prolapse with minimal or trivial mitral incompetence should require no more stringent follow up than clinically indicated. Those with more significant sequelae will be considered in accordance with their ongoing risk and rate of deterioration of their condition.
2.2.8 Bundle Branch Blocks

Partial or Complete Left Bundle Branch Block (Not Including Left Anterior Hemiblock)

Class 1, 2 & 3 Medical Certificates

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Stress nucleotide scan
- Doppler echocardiogram
- Left ventricular gated blood scan to measure ejection fraction
- 24 hour Holter monitor recording.

If all of the investigations and cardiologist's reports are satisfactory, the applicant may be recertificated for 12 months.

Subsequent reviews

At annual intervals:
- Routine aviation medical examination
- Cardiologist’s review.

Incomplete Right Bundle Branch Block

This is a common finding. There are no specific requirements.
Complete Right Bundle Branch Block

Class 1, 2 and 3 Medical Certificates

**Note:** This may be a normal variant in young applicants. A cardiologist’s opinion should however be obtained in these cases.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Echocardiogram
- Stress ECG if combined with LAHB as the combination is associated with ischaemic heart disease.

If all of the investigations and cardiologist's reports are satisfactory, the applicant may be recertificated for the maximum period permitted for the relevant medical certificate.

Left Anterior Hemiblocks

Class 1, 2 and 3 Medical Certificates

This is a common finding, however if this is a newly acquired condition, a stress ECG should be performed. If this is normal, there is no requirement for further reviews.

Atrio-Ventricular Blocks

First Degree

The only specific investigation required for those with first degree AV block is for a resting ECG, taken after exercise to ensure the block normalises with exercise. This may practicably be done in the DAME office.
Second Degree — Class 1, 2 and 3 Medical Certificates

Otherwise, on diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Cardiologist’s assessment
- 24 hour Holter monitor recording
- Stress ECG.

If all of the investigations and cardiologist's reports are satisfactory, the applicant may be recertificated for 12 months. Applicants with untreated heartblocks of 2:1 or greater will not be recertificated for any class of medical certificate.

Subsequent Reviews

An annual ECG is required.

Third Degree Heart Block

Restricted certification may be available with the use of pacemakers.

Class 1, 2 and 3 Medical Certificates

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Stress ECG (to assess cardiac function)
- 24 hour Holter monitor recording.

Note: The pacemaker is to be dual chambered with bipolar leads, due to the unacceptable risk of electrical interference with pacemakers that have unipolar leads. The pacemaker is to have a technical check every 12 months, with the outcome reported to the Aviation Medicine Section.
Atrial Fibrillation and Atrial Flutter

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment, with particular reference to history and presence of any congenital abnormalities
- ECG
- 24 hour Holter monitor
- Doppler echocardiogram
- Stress test (to evaluate rate control at high workload)
- Biochemical profile, including: thyroid function studies, liver function studies, serum magnesium and potassium levels, fasting blood glucose (FBG).
- Haemoglobin estimation.

If drug treatment is required, there must be adequate rate control (as assessed by a cardiologist), without significant side effects. There should be no underlying structural heart disease. In these circumstances, all applicants may be recertificated for 12 months without restriction, unless prescribed warfarin. Where Warfarin is prescribed, CASA will require evidence of good INR control.

Subsequent Reviews

At annual intervals:

- Routine aviation medical examination
- Cardiologist’s review.

Bradycardias

Bradycardia should be taken in context. In a normally fit and healthy person or in an athletic individual there is nil concern. If the individual is generally unfit, has symptomatic bradycardia or if other ECG anomalies are associated with the bradycardia, then the applicant should be referred for cardiological assessment.
Ventricular Tachycardias

Ventricular tachycardias is most commonly picked up in the context of a stress test, in which case it may be normal. If VT arises in other contexts, the applicant should be referred for cardiological assessment.

Supraventricular Tachycardias

Most individuals with frequent episodes of supraventricular tachycardias will receive radiofrequency ablation, which, if successful, will be of no further concern. If controlled by medication, cardiological review should be sought with each medical examination. Applicants with SVT will be assessed on a case-by-case basis, however those with frequent episodes, and particularly those who experience significant symptoms with SVT may not be considered fit.

Wolff-Parkinson-White Syndrome

Class 1, 2 and 3 Medical Certificates

On diagnosis of the condition, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA.

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- Electrophysiological studies.

If WPWS is confirmed, the applicant is assessed as unfit until radiofrequency ablation of aberrant conduction pathways has been performed and the treating cardiologist has certified that conduction has been normalised.

Individuals who have demonstrated long refractory periods, where the WPW abnormality normalises on exercise may be considered for restricted certification on a case-by-case basis.
Subsequent Reviews

At six months, 12 months and 24 months post successful radiofrequency ablation of aberrant conduction pathways, the following are required:

- Routine aviation medical examination
- Cardiologist’s review.

If there is no recurrence of abnormal conduction within 24 months of successful radiofrequency ablation, further recertification without restriction should follow the normal pattern for the applicant’s age and class of medical certificate.

Prolonged QT Syndrome

Those applicants with long QT syndrome will generally be disqualified due to the risk of sudden death. Individuals will be assessed on a case-by-case basis, based on cardiological opinion.

Brugada Syndrome

Applicants with Brugada syndrome on ECG will require individual assessment by an electrophysiologist and cardiologist. Stratification is difficult; however there may be a subgroup with a relatively good prognosis. However, most individuals with Brugada syndrome will be assessed as unfit. Insertion of implantable defibrillator is not adequate risk mitigation in these individuals.

Defibrillators

Applicants requiring implantable defibrillators will be assessed as unfit. Studies show that 15% of shocks delivered are inappropriate. They are also potentially affected by EMF emissions. In addition, the risk of acute incapacity associated with a shock, regardless of the underlying pathology, is considered incompatible with aeromedical certification.

Corrected Congenital Heart Anomalies

In many cases, residual haemodynamic defects may preclude medical certification at any level for these applicants. Each case will be dealt with on its individual merits. A comprehensive cardiological work-up and report should be completed and full details forwarded to Aviation Medicine Section for assessment.
Other Cardiological Abnormalities

These can be extremely varied and range from trivial conditions to those which absolutely preclude medical certification at any level for these applicants. Each case will be dealt with on its individual merits. A comprehensive cardiological work-up and report should be completed and full details forwarded to Aviation Medicine Section for assessment.

2.2.9 Cardiomyopathies

Dilated Cardiomyopathy

Class 1, 2 and 3 Medical Certificates

Recertification

Investigations required for recertification are:

- Routine aviation medical examination
- Cardiologist’s assessment
- ECG
- Doppler echocardiogram
- Two recordings of 24 hours Holter monitor studies
- Gated blood pool scan or echocardiogram assessment of cardiac output.

If ejection fraction is greater than 45% with no symptoms and a normal Holter monitor report, then a restricted certificate, on the basis of cardiological assessment of ongoing risk of arrhythmia etc, may be allowed. Individuals will be assessed on a case-by-case basis.

Subsequent Reviews

Class 1: Cardiologist’s review with gated blood pool scan or echocardiogram.
Hypertrophic Cardiomyopathy

Class 1, 2 and 3 Medical Certificates

Recertification

This condition is generally disqualifying. In all cases, further certification will be appropriately restricted.

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment, including detailed family history
- Stress ECG
- Doppler echocardiogram
- 24 hour Holter monitor recording.

If all of the investigations and the cardiologist’s report are satisfactory, and septal thickness is less than 1.5 cm, restricted recertification may be available.

Subsequent Reviews

Requirements will be individually determined and notified.

2.2.10 Cardiac Transplant

Applicants for Class 1 certification will be assessed as unfit.

Class 2 and 3

Recertification

Investigations required for recertification are:
- Routine aviation medical examination
- Cardiologist’s assessment
- Coronary angiogram (for detection of atherosclerosis)
- 24 hour Holter monitor recording
- Doppler echocardiogram.

If all of the investigations and the cardiologist’s report are satisfactory, Class 2 and Class 3 applicants may be recertificated on an individually determined basis.
Subsequent Reviews

At six-monthly intervals:
- Routine aviation medical examination
- Cardiologist’s review.

At annual intervals:
- Stress nucleotide scan
- Coronary angiogram (to assess coronary atherosclerosis)
- Doppler echocardiogram.
2.3.1 Introduction

This section details the assessment procedures for pilots, other aircrew members and air traffic controllers who suffer or who may suffer from lung or respiratory system disease.

The aim of the respiratory assessment within the aeromedical examination is to ensure that applicants do not suffer from lung or respiratory system disease which places them at an unacceptable risk of incapacitation, or which may otherwise jeopardise the safety of air navigation.

2.3.2 The Respiratory Standard – CASR Part 67

CASR 67.150 For medical standard 1
CASR 67.155 For medical standard 2
CASR 67.160 For medical standard 3

2.3.3 Assessment

All applicants for Australian aviation medical certificates are administered a comprehensive screening questionnaire physically examined by a DAME, and required to undertake a number of screening tests.

When conducting the respiratory component of the aeromedical examination, the DAME should note the presence of relevant risk factors for the development of lung and respiratory system disease and the presence of signs and symptoms suggestive or diagnostic of such conditions.

For example: risk factors for the development of asthma include:

- Family history of asthma
- Personal or family history of smoking
- Other allergies or atopic symptoms.
2.3 Respiratory Disease

2.3.2 FEV₁ is measured at the original assessment and each renewal assessment. (Note spirometers should be calibrated to BTPS). Chest X Rays may be required if the applicant’s history or physical signs so indicate. This is likeliest in smokers or ex-smokers. Routine Chest X Ray is not required.

Further investigation of respiratory abnormalities may include flow loop spirometry, measurement of diffusion capacity, blood gas estimation (both at ground level and at simulated altitude) and various forms of imaging of the respiratory system.

Referral to a consultant respiratory physician may be required to confirm a diagnosis or to resolve concern over a differential diagnosis. CASA may also require an applicant for medical certification to be assessed by a consultant respiratory physician as part of its consideration of an applicant’s fitness for aeromedical certification.

2.3.4 Documentation of Respiratory Conditions

Many respiratory conditions are principally diagnosed and classified on the basis of history. DAMEs should take a careful and thorough clinical history before reaching a respiratory diagnosis, particularly a diagnosis that may significantly affect an applicant’s employment prospects. Particular attention must be paid to chronic use of any medications that are incompatible with the exercise of the privileges of licensure. Also see Section 2.13 Medication – Drugs and Flying/Controlling.

2.3.5 Asthma

Diagnosis and assessment

In the first instance care should be taken to ensure an accurate diagnosis of asthma, noting that the criteria of recurrent, reversible airways obstruction should be met. Subsequent assessment of asthma should distinguish between severity and control. Severity is in part determined by the amount of treatment required to maintain control (as evidenced by type and quantity of prescription or over-the-counter medications required to control asthma symptoms, the requirement for oral steroid medication and the number of Emergency Room presentations or hospital admissions due to asthma). CASA will not usually certificate applicants who suffer from severe asthma. Uncontrolled asthma, regardless of severity, is not acceptable in the aviation environment, and will preclude the issuing of any class of CASA medical certificate.

Applicants who have asthma which is well controlled (if necessary using anti-inflammatory therapy) may be eligible for any class of medical certificate. Applicants with mild well controlled asthma maybe required to undergo periodic spirometry. In the case of applicants with moderate well controlled asthma, periodic assessment by a respiratory physician may be required. CASA will notify specific requirements on a case-by-case basis.
Asthma severity

Severe asthma

Applicants with severe asthma experience continuous symptoms, limited physical capacity, and have a FEV₁ or peak flow measurement of less than or equal to 60% predicted. Peak flow variability may be greater than 30%. Treatment requirements of patients with severe asthma will likely include moderate or high doses of inhaled corticosteroid, with or without long-acting beta-agonist, oral theophylline, or inhaled anticholinergic. Some applicants may require oral corticosteroid. Patients with severe asthma may require care through hospital Emergency Rooms or even hospital admission when control of the condition is poor.

Moderate asthma

Applicants with moderate asthma generally have symptoms of airflow obstruction most of the time, and experience some impairment of physical capacity. Their FEV₁ or peak flow will be in the range 60-80% predicted, and peak flow variability may be greater than 15%. Treatment requirements will likely include low to moderate doses of inhaled corticosteroid, (e.g. beclomethasone 400-1000 micrograms per day or equivalent).

Mild asthma

Applicants with mild asthma generally have intermittent symptoms, interposed between symptom-free intervals that may be prolonged. FEV₁ and peak flows are often normal, and there may be no peak flow variability.

Asthma control

For CASA’s purposes, good control requires that, in the three months preceding assessment, the applicant:

- Has experienced no or minimal cough, wheeze or breathlessness on exercise or during the night
- Has maintained "best" pulmonary function
- Has maintained stable exercise capacity, although possibly somewhat impaired
- Has not required treatment with oral corticosteroid
- Has not required an Emergency Room visit/hospital admission for symptoms of asthma.
2.3.6 Chronic Bronchitis and Emphysema

Smokers aged 45 or more should undergo increased screening for these conditions for all classes of medical certificates. Positive findings dictate a full respiratory assessment, including a report by a respiratory physician. It is unlikely that applicants with severe chronic bronchitis or emphysema will meet the medical standard for issue of a class 1 medical certificate. However, restricted class 2 and 3 certification may be possible, on a case-by-case basis.

2.3.7 Pneumothorax

**Traumatic Pneumothorax.**

Medical certification for all classes is usually possible after review of medical reports covering precipitating factors, associated problems, extent of recovery and subsequent lung function. Full assessment by a respiratory physician may be required.

**Single Spontaneous Pneumothorax.**

An applicant who has had a spontaneous pneumothorax with full recovery and no obvious cause nor likelihood of recurrence may be assessed as fit for all classes of medical certification.

**Recurrent Spontaneous Pneumothorax.**

An applicant with recurrent spontaneous pneumothorax (defined as two or more episodes on the same side) is not usually acceptable for any class of medical certificate. If the pneumothorax has been surgically corrected by pleurodesis (mechanical or chemical) or pleurectomy, the applicant may be assessed as fit. Assessment by a respiratory physician may be required.

2.3.8 Pulmonary Tuberculosis

An applicant with active tuberculosis (but not open tuberculosis) may be medically certificated for any class provided there is adequate evidence that he/she is on appropriate therapy and there is no evidence of side effects from the therapy. Applicants with fully treated pulmonary tuberculosis should be aero medically assessed to determine the extent of lung damage/recovery. Assessment by a respiratory physician is required in all cases.
2.3.9 Sarcoidosis

Sarcoidosis is usually acceptable for all classes of medical certification, provided myocardial and other system sarcoidosis has been excluded. Reports of full cardiovascular and respiratory assessments are required.

2.3.10 Pulmonary Embolism

An applicant who develops pulmonary embolism must be comprehensively investigated to determine if there are significant underlying reasons for the episode. Once recovery is complete and the applicant demonstrates normal pulmonary function (including normal blood gases), unrestricted medical certification at any class is usually possible. CASA will not usually consider re-certification until at least 8 weeks after the episode. Pilots who are prescribed long-term anticoagulation with warfarin following a pulmonary embolism may be granted conditional certification.

2.3.11 Fibrosing Lung Diseases

Applicants with these conditions require full respiratory assessment, including blood gas estimation. Thereafter, certification may be possible on a case-by-case basis.

2.3.12 Obstructive Sleep Apnoea (OSA)

This condition is often under-reported because applicants fear loss of certification. DAMEs must specifically inquire whether or not the applicant has conditions that suggest OSA eg, loud habitual snoring, witnessed apnoea. Where the diagnosis is entertained, the Epworth Sleepiness Scale must be administered to the applicant. If the resulting score is 16 or more, assessment by a sleep physician is required. Following definitive diagnosis of OSA, unrestricted medical certification at all classes is usually possible after appropriate corrective treatment has been instituted and demonstrated to be successful. This usually requires reports from a sleep physician, before and after treatment.

Also see ‘Sleep Disorders’ in Section 2.6.17 (Psychiatry).

The Epworth Sleepiness Scale provides an estimate of the likelihood of dozing or falling asleep, in contrast to just feeling tired.

Applicants suspected of suffering from OSA should be questioned about their sleepiness during normal activities. (Even if the applicant has not recently undertaken some of these activities, they should be asked to estimate their relevant chance of dozing based on prior experiences).
Use this scale to allocate scores under 'chance of dozing' in each situation described.

0 = no chance of dozing
1 = slight chance of dozing
2 = moderate chance of dozing
3 = high chance of dozing

<table>
<thead>
<tr>
<th>Situation</th>
<th>Chance of dozing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting and reading</td>
<td></td>
</tr>
<tr>
<td>Watching television</td>
<td></td>
</tr>
<tr>
<td>Sitting inactive in a public place (e.g. a cinema or meeting)</td>
<td></td>
</tr>
<tr>
<td>As passenger in a car for &gt; 1 hour</td>
<td></td>
</tr>
<tr>
<td>Lying down to rest in the afternoon when circumstances permit</td>
<td></td>
</tr>
<tr>
<td>Sitting and talking to a companion</td>
<td></td>
</tr>
<tr>
<td>Sitting quietly after an alcohol-free lunch</td>
<td></td>
</tr>
<tr>
<td>In a car, while stopped briefly in heavy traffic</td>
<td></td>
</tr>
</tbody>
</table>

**Total Epworth Sleepiness Score**

If the score is 16 or more, assessment by a sleep physician is required.

(The Epworth Sleepiness Scale is reproduced with the permission of Dr M.W. Johns, A new method for measuring daytime sleepiness: the Epworth sleepiness scale. Sleep, 14(6):540-545.)
2.4.1 Introduction

This section details the assessment of pilots, other aircrew members and air traffic controllers who suffer or who may suffer from endocrine disease or from metabolic disorders.

The aim of the endocrine assessment within the aeromedical examination is to ensure that applicants do not suffer from endocrine or metabolic conditions which place them at an increased risk of incapacitation or which may produce a decrement in physiological or psychological function sufficient to jeopardise the safety of air navigation. In conducting the aeromedical examination, the DAME will recognise that an individual who holds an unrestricted medical certificate must be capable of performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities may include flight (either as a private or professional pilot):

- For prolonged duration, often as part of a shift roster
- Subject to disrupted sleep and time zone changes
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning

A number of these stressors may also affect Air Traffic Controllers.
2.4.2 The Endocrine Standard – CASR Part 67

The endocrine standards are found in the following paragraphs of CASR Part 67:

**For Medical Standard 1:**

A person suffering from diabetes mellitus may be assessed as meeting medical standard 1 if the condition is satisfactorily controlled without the use of any anti-diabetic drug.

**For Medical Standard 2:**

A person who suffers from diabetes mellitus may be assessed as meeting medical standard 2 if:

a. The condition is satisfactorily controlled without the use of any anti-diabetic drug; or

b. If an oral anti-diabetic drug is used to control the condition:
   i. The condition is under on-going medical supervision and control; and
   ii. The oral drug is approved by CASA.

**For Medical Standard 3:**

A person who suffers from diabetes mellitus may be assessed as meeting medical standard 3 if:

a. The condition is satisfactorily controlled without the use of any anti-diabetic drug; or

b. If an oral anti-diabetic drug is used to control the condition:
   i. The condition is under on-going medical supervision and control; and
   ii. The oral drug is approved by CASA.
2.4.3 **Assessment of the Endocrine System**

All applicants for Australian aviation medical certificates are required to complete a comprehensive screening questionnaire, to be physically examined by a DAME, and to undertake urinalysis for the presence of urinary glucose. In addition, applicants for Class 1 and Class 3 medical certificates are required to undergo fasting blood glucose estimation at the same time as they undergo five-yearly fasting lipid estimation. (CASA intends to introduce a requirement that applicants for Class 2 medical certificates will also be screened five yearly for diabetes mellitus by means of fasting blood glucose estimation).

When conducting an aeromedical examination, the DAME should note the presence of relevant risk factors for the development of endocrine or metabolic diseases and the presence of signs and symptoms suggestive or diagnostic of such conditions. Where such an endocrine condition is confirmed, evidence of secondary pathology or of accompanying complications should be sought and documented.

For example, risk factors for the development of diabetes mellitus include:

- Ethnic group
- Age >55 years
- Positive family history
- Obesity or significant overweight
- Abnormality of glucose tolerance
- Pregnancy
- Hypertension, dyslipidaemia, or clinical macrovascular disease
- Lack of regular exercise
- Use of diabetogenic medications.

Evidence of pathology secondary to diabetes mellitus may include vascular disease, retinal disease or renal disease.
2.4.4 Diabetes Mellitus and Impaired Glucose Tolerance

The incidence and prevalence of diabetes mellitus (of all types) has increased considerably in Australia in recent years. Up to 7.5% of the population now meets the diagnostic criteria for the condition (see Biochemical Investigations below). This is significant for aviation safety as diabetes mellitus is disqualifying for certification for aviation and air traffic control duties. The major aeromedical risk of diabetes relates to incapacitation (either overt or subtle), while it is also a major independent risk factor for a number of other incapacitating conditions—for example, stroke, acute myocardial infarction.

However, there is provision in the Civil Aviation Regulations for ‘a person who suffers from diabetes to be assessed as meeting the medical standard if the approved person conducting the relevant examination is satisfied that the diabetes is satisfactorily controlled without the use of an anti-diabetic drug’ or, for Class 2 and 3 medical certificate applicants, ‘where an oral anti-diabetic drug (approved by the Director of Aviation Medicine) is used to control the condition, the person provides evidence that he or she is undertaking on-going supervision and control of the condition’.

Classification of Diabetes Mellitus

Diabetes/diabetes precursor conditions are conventionally classified into four major types:
- Type 1 (absolute reduction in insulin production)
- Type 2 (resistance to the effects of insulin)
- Gestational
- Impaired glucose tolerance/impaired fasting glycaemia.

The majority of Type 1 diabetes mellitus sufferers use insulin regularly to manage the condition. Sufferers of Type 2 diabetes mellitus utilise a variety of management strategies: diet, oral hypoglycaemic agents and insulin, either singly or in combination.

Approximately one third of patients diagnosed with impaired glucose tolerance will subsequently have their glucose biochemistry return to normal, one third will continue to have impaired glucose tolerance and the remainder will eventually become sufferers of frank diabetes. Of aeromedical concern is the finding that all persons with impaired glucose tolerance have a statistically significant increase in their risk of developing ischaemic cardiovascular disease.
Biochemical Investigations

For medical certification purposes, any clinical suspicion of diabetes mellitus (such as urinalysis showing the presence of glycosuria) should be confirmed biochemically.

CASA recognises the following biochemical criteria, documented on at least two separate days, as confirming the diagnosis of diabetes mellitus:

- Fasting venous plasma glucose >6.9 mmol/l (less than 5.5 mmol/l—diabetes unlikely)
- Casual (random) venous plasma glucose >11.1 mmol/l (less than 5.5 mmol/l—diabetes unlikely).

Equivocal results of a fasting venous plasma glucose or casual venous plasma glucose estimation (between 5.5 and 6.9 mmol/l fasting or between 5.5 and 11.0 mmol/l casual) may indicate impaired glucose tolerance. In the event of an equivocal blood glucose result, DAMEs should order a 75 gram oral glucose tolerance test performed according to WHO 1999 guidelines and assessed according to the criteria in Table 2.4-1.

Table 2.4-1: WHO oral glucose tolerance test assessment criteria 1999

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Criteria—Venous plasma Glucose concentration (mmol/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes mellitus</td>
<td></td>
</tr>
<tr>
<td>Fasting value</td>
<td>≥7.0 or</td>
</tr>
<tr>
<td>2 hr post glucose load</td>
<td>&gt;11.1</td>
</tr>
<tr>
<td>Impaired glucose tolerance</td>
<td></td>
</tr>
<tr>
<td>Fasting value</td>
<td>&lt;7.0 and</td>
</tr>
<tr>
<td>2 hr post glucose load</td>
<td>7.8–11.0</td>
</tr>
<tr>
<td>Impaired fasting glucose</td>
<td></td>
</tr>
<tr>
<td>Fasting value</td>
<td>6.1–6.9 and</td>
</tr>
<tr>
<td>2 hr post glucose load</td>
<td>&lt;7.8</td>
</tr>
<tr>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>Fasting value</td>
<td>&lt;6.1 and</td>
</tr>
<tr>
<td>2 hr post glucose load</td>
<td>&lt;7.8</td>
</tr>
</tbody>
</table>
Other Investigations

All applicants for medical (re-)certification who have either diabetes mellitus or impaired glucose tolerance must also provide to the DAME the results of all glycosolated haemoglobin (HbA1c) estimations performed in the previous twelve months. A minimum of three estimations is required, with the most recent being performed no more than one month prior to DAME examination. (HbA1c results should be reported in % HbA1c and should indicate the laboratory reference range for the estimations.)

In addition, CASA requires the following information and test results from applicants with diabetes mellitus:

- A recent report (within three months) from an endocrinologist or specialist physician:
  - Current status of control of diabetes
  - Whether the applicant has any history of hypoglycaemia/hyperglycaemia in preceding 12 months.
  - If so, whether there was any requirement for external intervention or assistance.

- A copy of the applicant’s diary of ambulant blood glucose monitoring throughout the three months immediately prior to DAME examination. Desirable ranges are:
  - No readings below 2.8 mmol/litre
  - At least 90% of values between 5.5 mmol/litre and 10 mmol/litre.

- A copy of the applicant’s most recent annual ophthalmological assessment detailing:
  - Clinical status
  - Visual acuity (with and without correction)
  - Presence of retinal disease
  - Presence of other ophthalmic pathology.

- A copy of a recent cardiovascular assessment by a cardiologist or specialist physician, including results of resting ECG and interval Stress ECG. The report should detail:
  - Clinical status
  - Presence and control of risk factors—for example, hypertension, smoking, hyperlipidaemia (total cholesterol, LDL and HDL)
  - Assessed risk of any acutely disabling cardiovascular event.

- The result of recent renal function tests, including 24 hour urine protein excretion.

- Certification that the applicant has completed and understood a course of diabetic management education.

There are no specific requirements for applicants who have impaired glucose tolerance or impaired fasting glycaemia where these conditions have not progressed to frank diabetes mellitus. However, CASA advises DAMEs to counsel affected applicants on the potential aeromedical certification consequences of their progression to frank diabetes mellitus and to initiate or refer them for appropriate clinical management.
Medical Certification of Persons with Diabetes Mellitus

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

Requirements for medical (re-)certification are set out in the following paragraphs.

1. Persons with diabetes mellitus controlled by diet may receive medical certification at Class 1, 2 or 3 provided they meet the following criteria:
   - Evidence of stable blood glucose control:
     - Glycosolated Haemoglobin (HbA1c) taken within one month of assessment <7.5%.
     - Satisfactory reports as detailed under Other Investigations
   - Absence of complications that could result in sudden or subtle incapacitation when exercising the privileges of a licence.

2. Persons with diabetes mellitus controlled by diet and oral hypoglycaemic drug(s) may receive unlimited medical certification at Class 2 or 3 levels only. Such persons who seek Class 1 (re-)certification may be offered (re-)certification with an ‘as or with co-pilot’ restriction. Prior to their (re-)certification, CASA requires objective evidence that these applicants meet the following criteria:
   - No unacceptable side effects from drugs
   - Evidence of stable blood glucose control
     - No episode of symptomatic hypoglycaemia during the preceding 12 months
     - Glycosolated Haemoglobin (HbA1c), taken within preceding month <7.5%
     - Satisfactory reports as detailed in the previous section, Other Investigations
   - Absence of neurological, cardiovascular, ophthalmological, renal or other complications of diabetes mellitus that could result in sudden or unpredictable incapacitation when exercising the privileges of a licence.

3. Persons with diabetes mellitus who require insulin treatment do not meet the mandatory medical standards and are not fit for medical certification. However, in appropriate cases, the Director of Aviation Medicine may exercise discretion and issue a Class 2 medical certificate endorsed with the conditions ‘to fly with safety pilot only’ and Holder does not fully meet the requirements of ICAO convention Chapter 6 of Annexe 1’. Prior to such certification, CASA requires:
   - Evidence of stable blood glucose control
     - No episode of symptomatic hypoglycaemia requiring intervention by others in the preceding 12 months
     - Serial Glycosolated Haemoglobin (HbA1c) estimations at two month intervals over the preceding 6 months—all results <7.5%
2. Medical Aspects
2.4 Endocrinology

- Satisfactory reports as detailed in the previous section, Other Investigations
- Absence of neurological, cardiovascular, ophthalmological or renal complications of diabetes that could result in sudden or unpredictable incapacitation when exercising the privileges of a licence.

4. Persons who are desirous of flying Class 2 without a safety pilot can be certificated provided they are able to comply with the protocol as below. Not all pilots can enter this protocol, (see exclusion criteria). However, those who are not excluded are able to be certificated if they meet the requirements as below. There are requirements for consideration, monitoring, and reconsideration for certification in the protocol.

Special Glucose Level Monitors

Individuals with diabetes mellitus who receive aeromedical (re-)certification must possess and use a memory chip glucose meter for ambulatory blood glucose monitoring. The meter, together with a readily absorbable source of glucose, must be carried by the applicant while exercising the privileges of a licence. (When real-time ambulatory glucose monitoring becomes readily available in Australia, CASA may require this form of monitoring instead of monitoring with memory chip glucose meters.)

Change in Treatment

When an applicant’s oral hypoglycaemic medication is changed, or when its dosage is changed, he or she must not exercise the privileges of an aviation licence until the attending medical practitioner supervising the medication is satisfied that he or she is again stable and a DAME has recertified his or her fitness in accordance with CASA’s relevant medical standards.

Protocol for Type 1 Diabetic Pilot Applicants

Requirements for first certification of Class 2 Type 1 diabetics (on insulin)

Exclusion criteria

The applicant must have had no recurrent (two or more) episodes of hypoglycaemia (resulting in intervention by another party) in the past 5 years and none in the preceding 1 year.

The applicant must not have complications such as:

- Autonomic neuropathy
- Significant Cardiovascular disease
- Retinopathy
- Renal Disease
**Information to be provided**

The applicant will be required to provide copies of all medical records as well as aviation accident and incident records pertinent to their history of diabetes.

A report of a complete medical examination by an Endocrinologist will be required. The report must include, as a minimum:

- Two measurements of glycosylated haemoglobin (total A1 or A1c concentration and the laboratory reference range), the first at least 90 days prior to the current measurement.
- Specific reference to the applicant’s insulin dosages and diet.
- Specific reference to the presence or absence of cerebrovascular, cardiovascular, peripheral vascular disease and neuropathy.
- Confirmation by an ophthalmologist of the absence of clinically significant diabetic eye disease.
- Verification that the applicant has been educated in diabetes and its control and understands the actions that should be taken if complications, especially hypoglycaemia, should arise.
- The examining physician must also verify that the applicant has the ability and willingness to satisfactorily monitor and manage his or her diabetes.
- If the applicant is age 40 or older, a report, with ECG tracings, of a maximal graded exercise stress test.
- The applicant shall submit a statement from his/her treating physician, aviation medical examiner, or other knowledgeable person attesting to the applicant’s dexterity and ability to determine blood glucose levels using a recording glucometer.

**Medical factors considered in CASA’s decision making**

Indicative criteria for blood sugar control that may be considered reasonable for consideration of entry into the following protocol are:

- HbA1c between 6.5 and 8.0
- Blood glucose analysis (over a three month period immediately prior to the time of application) indicating:
  - No more than 5% of readings below 4.0 mmol/L
  - 80% of readings must be between 5 and 15 mmol/L
- Other factors that can influence outcomes could include but are not limited to:
  a. Excessive frequency of hypoglycaemia or hyperglycaemia
  b. Documented hypoglycaemic unawareness
  c. Poor treatment compliance
Implications of acceptance of meeting the criteria by CASA

If applicants meet the above criteria, they will be considered by CASA for entry into the protocol cohort on a case by case basis.

If accepted into the cohort, the applicant will initially be issued a Class 2 certificate valid for flight with safety pilot only. To have the safety pilot requirement removed, the applicant must carry out the in-flight requirements in a two pilot situation for a minimum of 15 flights (details of types of flights and durations will be tailored by CASA to meet individual requirements) and provide the on-ground and in-flight data to CASA for assessment and consideration.

**Monitoring and Actions Required During Flight Operations**

To ensure safe flight, the insulin-using diabetic aviator must carry two recording devices during flight, preferably a Continuous Glucose Monitoring System and a back up glucometer, adequate supplies to obtain blood samples, and amount of rapidly absorbable glucose in 15 gm portions, appropriate to the planned duration of the flight.

The aviator must discuss this protocol with his treating physician and obtain advice as to the best combination of food intake/ medication that will optimise the glycaemic control without adversely affecting safety.

The following actions shall be taken in connection with flight operations:

1. Flight should not commence within 90 minutes of the administration of insulin (either short or long acting types), unless an insulin pump is used.
2. One-half hour prior to flight, the aviator must measure the blood glucose concentration.
   - If the concentration is more than 15 mmols/l the flight must be cancelled.
   - If it is less than 5mmol/l the individual must ingest an appropriate (not less than 15 gm) glucose snack and measure the glucose concentration one-half hour later. If the concentration is within 5-15mmol/l, flight operations may be undertaken. If the blood glucose is less than 5 mmol/l, the process must be repeated; if over 15mmol/l, the flight must be cancelled.
3. 30 minutes into the flight, and at each successive hour of flight, and within one-half hour prior to landing, the aviator must measure his or her blood glucose concentration.
   - If the concentration is less than 5mmols/l, a 30 gm glucose snack must be ingested, and arrangements be made to land at the nearest suitable airport and may not resume flight until the glucose concentration can be maintained in the 5- 15 mmols/l range.
   - If the concentration is 5-15 mmol/l, no action is required.
   - If the concentration is greater that 15mmol/l, the aviator must land at the nearest suitable airport and may not resume flight until the glucose concentration can be maintained in the 5-15 mmols/l range (Please also note para 1 above).
In respect to determining blood glucose concentrations during flight, the aviator must use judgment in deciding whether measuring concentrations or operational demands of the environment (e.g., adverse weather, etc.) should take priority. In cases where it is decided that operational demands take priority, the aviator must ingest a 15 gm glucose snack and measure his or her blood glucose level 1 hour later. If measurement is not practical at that time, the aviator must ingest a 30 gm glucose snack and land at the nearest suitable airport so that a determination of the blood glucose concentration may be made.

Ongoing requirements for any subsequent medical certification

For documentation of diabetes management, the applicant will be required to carry and use two whole blood glucose measuring devices with memory function and must report to the CASA immediately any hypoglycaemic incidents requiring external assistance, any involvement in accidents resulting in serious injury (whether or not related to hypoglycaemia), and any evidence of loss of control of diabetes, change in treatment regimen, or significant diabetic complications. With any of these occurrences, the individual must cease flying until cleared by the CASA.

At 3-month intervals, the aviator must be evaluated by the treating endocrinologist. This evaluation must include a general physical examination, review of the interval medical history, and the results of a test for glycosylated haemoglobin concentration. The endocrinologist must review the record of the aviator’s daily blood glucose measurements and comment on the results (the blood glucose measurements must be done at least 4 times every day). The results of these quarterly evaluations must be accumulated and submitted annually unless there has been a change in the treatment regime, or if the endocrinologist’s review is indicative of a deterioration of control. The results must include a downloaded set of blood sugar readings to be analysed to identify “high” and “low” readings outside the physiological range (See indicative criteria above. If there has been a change the individual must report the change(s) to the CASA and wait for an eligibility letter before resuming flight duties).

On an annual basis, the reports from the examining endocrinologist must include confirmation by an eye specialist of the absence of significant eye disease.

At the first examination after age 40 and at 5-year intervals, the report, with ECG tracings, of a maximal graded exercise stress test must be included in consideration of continued medical certification. The record of all in-flight measurements and log book entries for all flights undertaken since the last certificate must be provided to CASA at the time of all subsequent medical certifications.
2.4.5 Thyroid Disorders

The major aeromedical concern accompanying thyroid disease is the potential for abnormally high or low levels of thyroid hormone to affect an applicant’s cognitive function. Thyroid tumours have the potential to cause local symptoms or to metastasise to critical locations.

Investigation

Clinical suspicion of thyroid disease should be confirmed by appropriate investigations. These may include various imaging techniques, the use of fine needle biopsy, and biochemical thyroid function studies. CASA requires the results of thyroid function tests to establish that applicants are euthyroid prior to consideration for medical (re-)certification.

Medical Certification of Applicants Suffering from Thyroid Disorders

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA. Requirements for medical (re-)certification are set out in the following paragraphs.

Goitre

Persons with goitre are acceptable for medical certification provided that there is no evidence of thyroid dysfunction nor of vascular or airways obstruction.

Hypothyroidism

Persons who are hypothyroid may be medically certificated provided Thyroid Function Tests (TFTs) demonstrate that adequate replacement therapy has been instituted and control maintained. TFTs should be performed annually for the first three years following initial diagnosis and periodically thereafter, as determined on a case-by-case basis, with serial results submitted with requests for medical re-certification.

Hyperthyroidism

Persons diagnosed as suffering from hyperthyroidism may be recertified once they are stable after surgery/isotope treatment/stable on medication and TFTs demonstrate that they are euthyroid. TFTs should be performed annually for the first three years after treatment is instigated and periodically thereafter, as determined on a case-by-case basis, with serial results submitted with requests for medical re-certification.
Thyroid Cancers

Thyroid cancer is disqualifying under Civil Aviation Regulations (1988). Persons diagnosed with thyroid cancer are obliged to refrain from performing licensed duties until they have been reviewed by CASA and a clearance to resume duties has been issued. While prognosis for cancer depends on many factors\(^1\), in most cases of thyroid cancer CASA will require documentation of successful removal of the tumour, completion of any subsequent radiotherapy, and the absence of metastatic disease before considering an applicant for (re-)certification. Under certain circumstances, conditional certification may be offered to pilots suffering metastatic disease.

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\(^1\) These factors include the type of cancer, the stage of disease when discovered, the aggressiveness of the individual cancer, cell type, the types of treatment available, co-existing diseases and the general health of the individual.
2.4.6 **Gout/Hyperuricemia**

Gout and hyperuricaemia arouse aeromedical concerns because of the potentially incapacitating effect of acute symptomatic gout, and of the potential for high serum levels of uric acid to lead to symptomatic urolithiasis.

**Investigation**

Clinical suspicion of gout/hyperuricaemia should be confirmed by appropriate investigations, which may include estimations of serum uric acid levels and of urinary excretion rate. CASA will require the results of these investigations prior to considering an affected applicant for medical (re)certification. In the event that an applicant with gout suffers from abdominal pain, he/she should be investigated to exclude renal stone.

**Medical Certification of Applicants Suffering from Gout/Hyperuricaemia**

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

CASA will certificate applicants with gout/hyperuricaemia when the condition is satisfactorily controlled (either by diet or by allopurinol) and has been asymptomatic for at least one month. Applicants should not exercise the privileges of a licence when being treated with colchicine.

2.4.7 **Hypothalamic and Pituitary Disorders**

**Pituitary Adenoma**

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

Persons with pituitary adenoma will be assessed as unfit. Subsequent medical certification will depend on considerations of residual tumour, effects of raised intracranial pressure, any pressure effects on the optic chiasm, the effects of surgery or other treatment, the effects of any hormone excess or deficiency, and the effects of any drug therapy. In some instances, an applicant may be certificated with restrictions and appropriate surveillance following special medical assessment. Annual review, including reports from an endocrinologist or specialist physician and from an ophthalmologist, will be required.
Diabetes Insipidus

On diagnosis, inform the CASA Aviation Medicine Section and advise the applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

This condition is marked by polyuria resulting from failure of vasopressin secretion. Fluid deprivation tests are diagnostic. Treatment is with vasopressin or one of its analogues. After the treated condition has been stable for a minimum of six months, applicants may be medically certificated with restrictions and appropriate surveillance. All such cases require special medical assessment, and CASA will determine aeromedical certification, when appropriate, on a case-by-case basis.

2.4.8 Adrenocortical Disorders

Disorders of adrenocortical metabolism have the potential to incapacitate or impair the ability of a pilot or ATC to perform duties. In addition, the underlying causes of adrenocortical disorders may themselves have significant aeromedical implications.

Medical Certification of Persons Suffering from Adrenal Disorders

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

- Aeromedical disposition will depend on cause and nature of adrenal disorder. Each applicant will be considered on a case-by-case basis and full documentation will be required. Applicants should be clinically stable and adequately treated clinically for a minimum of three months before being considered for certification.
- Cushing’s Syndrome secondary to malignancy or ectopic ACTH secretion is disqualifying. Applicants with other causes may be certificated once the underlying disease has been effectively treated and hormonal status has returned to and been maintained within normal range for a minimum of three months.
- Applicants with Addison’s disease may be certificated once their underlying disease has been effectively treated and their endocrine status has returned to and been maintained within normal range for a minimum of three months.
2.4.9 Parathyroid Disorders

Parathyroid disorders and associated disorders of calcium metabolism have the potential to impair a person’s ability to control an aircraft or to act as an Air Traffic Controller. Hyperparathyroidism leading to hypercalcaemia increases the risk of renal stone formation, peptic ulcer, mental changes and cardiac arrhythmia. (Hypercalcaemia due to malignancy should be excluded in such cases.) The less common hypoparathyroidism, if associated with hypocalcaemia, may cause disabling neuromuscular irritability and abdominal cramps.

Investigations

Prior to (re-)certification of an applicant with parathyroid disease, CASA requires a report from an endocrinologist or specialist physician and copies of pre- and post-management serum calcium and PTH levels. If the applicant has suffered abdominal pain, CASA requires the results of imaging performed to exclude renal stones. Histology reports of specimens and the results of investigations to exclude underlying malignancy will assist in determination of the applicant’s fitness for medical (re-)certification.

Medical Certification of Persons Suffering from Parathyroid Disorders

On diagnosis, inform CASA Aviation Medicine Section and advise applicant not to exercise the privileges of his/her licence until cleared to do so by CASA.

- Applicants with hyperparathyroidism due to parathyroid adenoma may be (re-)certificated without condition(s) three months after surgical removal of the adenoma, provided that hormone and calcium levels have returned to and been maintained at normal levels. Hypercalcemia due to malignancy must be excluded. Full clinical details are required.

- Applicants with hypoparathyroidism may be (re-)certificated when estimation of hormone and calcium levels demonstrates that they have been stable on treatment (calcium and/or Vitamin D analogues) for at least three months.

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2 Note that poor venepuncture technique may lead to spurious PTH and calcium results.
2.4 Endocrinology

2.4.10 Hyperlipidaemia

Hyperlipidaemias are an important risk factor for the development of coronary artery disease, stroke and heart failure, which are important potential causes of in-flight incapacitation. Control of lipid levels is an important mechanism for reducing the risk of in-flight incapacitation due to vascular mishap. Similar considerations apply in the case of ATC staff.

Investigation

Blood for lipid estimation (including total cholesterol, HDL, LDL and glucose) should be drawn after fasting—that is, after the applicant has had nothing to eat or drink except water for 12-14 hours. Abstinence from alcohol for several days prior to the test may lower triglycerides levels. Dietary changes in the few days before testing have little effect on lipid levels.

Medical Certification of Persons Affected by Hyperlipidaemia

- Persons with elevated cholesterol/triglyceride levels controlled by dietary means and/or nutritional supplements are not of medical concern to CASA.
- CASA is primarily concerned over the potential for lipid lowering drugs to cause side effects of aeromedical significance. CASA will certificate pilots (both Class 1 and 2) or ATCs taking any of the lipid lowering drugs currently available on prescription in Australia, provided the applicant tolerates the medication well and experiences no significant adverse side effects. A minimum of one month of ground testing is required before the applicant returns to flying/controlling duties.
- Lipid estimation is part of CASA’s cardiovascular risk management program. Should a Class 1 or Class 3 medical certificate holder be found to have an annual risk of cardiovascular event greater than 1% (currently a score of 15 or more points on CASA’s cardiovascular risk assessment tool), he/she will be required to undergo a stress ECG per CASA protocol.
2.4 Endocrinology

2.4.11 Obesity

Obesity, defined for CASA’s purposes as a BMI >35, is of medical concern because:

- It is an independent risk factor for the development of vascular disease
- The physical dimensions of the obese person may reduce a pilot’s ability to manipulate an aircraft’s controls safely, or to escape in the event of an accident or incident.

**Investigation**

Applicants who have a BMI >35 must be assessed by a DAME, who is to seek evidence of other pathology secondary to the obesity. Obese pilots will be required to demonstrate their ability to control an aircraft safely and to escape in the event of an emergency as part of their certification assessment. This may involve undertaking a CASA directed operational flight/ground check.

**Medical Certification of Obese Applicants**

Obesity per se is only of concern to CASA from an air safety perspective if an applicant suffers from another aeromedically significant disease or condition secondary to the obesity or his/her physical dimensions affect the safe exercise of the privileges of a licence. Such applicants will be assessed on a case-by-case basis. Obese applicants who are otherwise well and can exercise the privileges of a licence safely will be certificated without restriction.

2.4.12 Anorexia

Adult applicants with a BMI <18.5 may suffer from an eating disorder. Prior to certification, a DAME should assess them to exclude such disorders. See section 2.6 Psychiatry.

2.4.13 Appetite Suppressants

CASA will not authorise pilots to fly or ATCs to perform ATC duties when taking any appetite suppressant medication.
2.5 Neurology

2.5.1 Introduction

This section on neurological disorders outlines some of the major categories of neurological diseases that are commonly encountered and indicates their aviation medical significance.

2.5.2 Nervous System Standard – CASR Part 67

The nervous system standards are found in the following paragraphs of CASR Part 67:

- **CASR 67.150**
  For medical standard 1
  CASR 67.150
  Table 67.150
  1.7 – 1.8

- **CASR 67.155**
  For medical standard 2
  CASR 67.155
  Table 67.155
  2.7 – 2.8

- **CASR 67.160**
  For medical standard 3
  CASR 67.160
  Table 67.160
  3.7 – 3.8
2.5.3 Headache

Nearly all applicants have experienced headache. The diagnosis of primary headaches are not discrete and the different types should be considered to be part of a continuous spectrum ranging from Muscular Tension Headache at one end to Classical Migraine at the other. Secondary headaches from other conditions eg, Cranial Neuralgia, Temporal Arteritis should be considered separately.

When considering primary headaches it is important to assess the history according to:

- **Speed of onset**: Is there warning eg, aura or no warning?
- **Period of prodrome**: seconds, minutes or hours?
- **Frequency**: isolated or recurrent, if recurrent how often. Time off work is a useful guide.
- **Neurological symptoms**: aura (crippling or just perceived), photophobia, visual changes, paraesthesia, paralysis, dysphasia etc.
- **Severity**: need for acute and intensive intervention such as parenteral opiate analgesics, degree of incapacitation such as need for bed rest vs ability to continue complex tasks.
- **Treatments and their effectiveness**: How effective prophylaxis if used. Type of acute treatment used eg, Tryptins and speed of response and any significant side effects.
- **Precipitating factors**: such as diet, oral contraceptive etc and effect of avoidance or withdrawal of such factors.

Since objective investigations will most usually negative, a detailed history is essential. The best history is obtained at first presentation.

*Migraine*

For strict diagnostic purposes, migraine is an acute but reversible transient cerebral vascular insufficiency phenomenon and headache is not necessary the most important component. When the vascular insufficiency effect predominates it should be distinguished from transient ischaemic attacks. In the worst case migrainous stroke can occur where the implication for flight duties is similar to that for stroke.

Beware of Atypical Migraine without headaches.

In common usage, the term migraine may refer to any headache, but there are two main types — common migraine and classical migraine.
Common Migraine (Migraine without Aura)

More than 80% of migraine sufferers experience "common" or "non-classical" migraine, which is not associated with sharply defined neurological disturbances.

It is often a label used for Tension Headache perceived to be of significant severity by the patient. Careful history will avoid the diagnosis of migraine with its implication vs. Tension Headaches

Diagnosis of "nonclassical" migraine depends on:

- Detailed history of headaches
- Usually an absence of significant neurological symptoms.

Treatment usually does not include parenteral opiates or specific migraine drugs such as vascular active agents.

Classical Migraine

Classical migraine is accompanied by any transient focal neurological and/or vascular phenomena that may include:

- Unilateral headache
- Hemiparesthesia, Hemiplegia
- Retinal/Occipital phenomena, such as visual disturbance of various degree and scotomata
- Basilar artery phenomena
- Autonomic symptoms of nausea, vomiting etc.

Such migraines have variable periods of remission and rate of onset, and may completely incapacitate the sufferer. There is no universal exclusion of medication. Significant side effect should be explored and their presence or absence documented.

Adverse factors for aeromedical certification include:

- Sudden significant neurological symptom such as loss of vision, weakness and incoordination with no warning
- Failure or of prophylactic treatment with frequent attacks
- Requirement for intensive treatment
- Short prodrome that does not allow effective use of acute treatment before symptom onset.

The Aviation Medicine Section considers all cases individually.
### Cluster Headache

Cluster headache is a subgroup of vascular headaches where the frequency of occurrence has a characteristic “cluster” nature. Aeromedical certification assessment considerations are similar to those for migraine. The details of history required are the same.

### Other Types of Headache

#### Tension (Muscle Contraction) Headache

This category of headache can assume the nature of a vascular headache with a pulsating quality when it is severe and is often confused with migraine.

It includes headaches occurring secondary to other conditions that gave rise to muscular tension, e.g. eyestrain, cervical pathologies, psychiatric conditions in which management of the underlying cause is of prime importance.

Chronic tension headaches that require treatment such as anxiolytics or other drugs likely to cause a decreased state of alertness or diminished performance require specialised assessment.

#### Cranial Nerve Headache

The commonest of these conditions is trigeminal neuralgia. This may be idiopathic or secondary to underlying disease. Irritation of the nerve may be relieved by surgical intervention, which requires specialised neurosurgical assessment. Consideration must be given to the risk and implication for certification associated with any neurosurgery. The side effects of medications commonly used in its treatment include diminished judgement and diminished depth perception. Relevant history should be elicited and documented.

The Aviation Medicine Section assesses all cases individually.

#### Local Cranial Disease

**Temporal arteritis**

This condition need not be disqualifying if controlled, particularly when steroid therapy has been ceased. Full specialist reports are required for assessment.

Adverse factors associated with it include loss of vision and intracerebral involvement with significant functional sequelae.

The Aviation Medicine Section assesses all cases individually.
2.5.4 Blackouts, Loss of Consciousness and Syncope

These words are often used interchangeably by both laymen and medical professionals. A detailed description is more informative than the label. It does not necessary describe loss of consciousness (LOC) but can be used to mean an altered state of consciousness, vertigo or even psychiatric disturbance such as fugue-like states. Causes can be primarily neurological, secondary to cardiovascular pathology, gastrointestinal upset, physiological or even be specific to aviation causes such as G induced loss of consciousness.

History of the event is paramount in differentiation of the causes. The applicant should be directed to relive the experience in his/her own words, without prompting. Only when that is established should more direct questions about the circumstances before, during and after the event be asked. The patient’s account of sensations should be elicited. Observer history should be obtained if available. If uncertainty exists, record the uncertainty rather than introduce attempts at explanation. Such factual records allow further independent evaluation where necessary. The value and accuracy of the history deteriorates with time and repetition of recounting.

Specific features that will help in differentiating the physiological system involved are:

- **Prodrome**: absence or present.
- **Posture at the time of the episode**.
- **Period**: ie, duration of attack.
- **Postictal orientation**.
- **Activity before, immediately and within 24 hr preceding**.
- **Head trauma**.
- **Frequency**.
- **Urinary incontinence**.
- **Tongue biting**.
- **Observer report**: confirmation of patient’s account, particularly concerning convulsive movements. Time course to any convulsive movement is important ie, did it occur at the same time as LOC, or seconds later? 
  - **Bystanders’ action**: eg, promptly placing patient in prone or coma position, or keeping patient sitting/upright.
- **Family and/or past history**.
- **Known cardiovascular history or risks**.
- **History of infection such as recent viral infection that may support labyrinthitis**.
Depending on the historical features elicited, the need for referral to relevant specialist/s can be determined. If the cause is primarily neurological, refer to neurologist or neurosurgeon for clarification. For possible cardiovascular causes, cardiologist opinion should be sought. Where the history suggests vestibular problem, ENT opinion will be appropriate.

The Aviation Medicine Section assesses all cases individually.

**Concussion**

The term should be restricted to brief LOC in the setting of blunt head injury with no demonstrable intracranial injury. The emphasis is on the brief duration, which should be in the order of 5 minutes or less. If the event accords with these criteria and no sequelae are reported, it is generally of no significance for aeromedical certification. An exception is made for repeated concussions such as occur in boxers.

**Transient Global Amnesia (TGA)**

The cause of TGA is uncertain. It may be first warning of TIA. Current theory considers it to be a transient, migraine-type of vascular phenomenon. The condition should be distinguished from epilepsy, particularly complex partial epilepsy and symptomatic intracranial tumours.

Relapse can occur and may be precipitated by exercise, coitus, or exposure to water. A period of observation is necessary to monitor relapses. Risk of relapse is 30% and can recur once or twice. Where frequent attacks are present, other diagnoses should be considered.

The condition is benign and affected applicants can be aeromedically certificated following a suitable period of observation. Neurological reports are required in all cases and follow up reviews may be necessary.
2.5.5 Disorders of Equilibrium

**Benign Positional Vertigo**

This is a true rotational sensation accompanied by nystagmus, occurring only on change of head position. It is usually idiopathic or secondary to head trauma. Its course is variable. Assessment is based on the frequency of occurrences, their duration and severity.

**Acute Peripheral Vestibulopathy (Vestibular Neuronitis and Acute Labyrinthitis)**

Diagnosis implies temporary unfitness to fly. If the condition settles without recurrence, a return to unrestricted flying may be permitted after three months.

**Menière's Disease and Acute Recurrent Positional Vestibulopathy (ARPV)**

In these conditions, vertigo usually lasts for hours and often causes chronic disequilibrium. Menière's disease and ARPV have high recurrence rates. Applicants with these conditions are usually unable to meet the standard for certification, but require individual assessment.

**Alternobaric Vertigo**

In this condition, vertigo occurs on change of air pressure, often after a forceful Valsava manoeuvre to clear the ears. Oscillopsia and nystagmus may accompany it.

Occasionally this condition is due to chronic eustachian tube compression (e.g. by hypertrophied adenoids) and may thus be surgically correctable. Recurrent cases are assessed individually.

**Momentary Vertigo**

This is generally considered to be benign unless there is evidence that it significantly affects the applicant.

**Non-Functioning/Hypo-Functioning Labyrinths**

This condition is characterised by unsteadiness of gait, by loss of orientation (particularly in the dark) and by inability to maintain accurate visual fixation while in motion. It is often secondary to aminoglycoside administration. The degree of functional impairment should be fully investigated for decision by the Aviation Medicine Section.
2.5 Neurology

Vestibular Imbalance

Applicants with this condition may experience feelings of unsteadiness on rapid change of position. It is generally benign and a "pass" assessment may be issued.

Multisensory Dizziness

This is a chronic condition of loss of balance or feeling of light-headedness in persons with multiple sensory disorders, such as a combination of two or more of:

- Peripheral neuropathy
- Vestibular imbalance
- Visual impairment
- Cervical spondylosis, and
- Hearing loss.

Multi-sensory dizziness is assessed according to the degree of disability present.

Note: Drugs used to control dizziness and vertigo often produce drowsiness. Control of these symptoms by drugs with such side effects is not acceptable for pilot or ATC medical certification. See also Section 2.13 Medication – Drugs and Flying/Controlling
2.5.6 Seizure Disorders

General

The tendency towards epileptic seizures is not an “all or nothing” phenomenon. Most people, under certain conditions, may have a seizure if sleep deprived or withdrawing from alcohol or benzodiazepines, especially if in addition they are taking medications that decrease the seizure threshold (e.g. tricyclic antidepressants). Approximately 2% of the population have a seizure during their lifetimes.

Following a single seizure, an adult has a 30-40% chance of recurrence. Those with a distinct epileptiform abnormality on the EEG, in the setting of a history of seizure, as opposed to non-specific abnormalities, have an increased risk of further seizures.

Diagnosis

It is imperative that there be an accurate diagnosis of the type of seizure. The importance of a description of the event cannot be overemphasised. While a useful diagnostic tool, any EEG must be reviewed by an experienced reader and must be evaluated in the context of the clinical history. It is not a useful sole diagnostic or screening tool.

The important components to the diagnosis are:

- More than one event, except Post Traumatic Epilepsy (PTE) for which one event will establish the diagnosis
- Must be unprovoked.

Video-EEG confirms the diagnosis but is not easily available as it is time consuming and difficult to organise except in academic research facilities.

Aeromedical certification considerations

A detailed history and specialist neurologist opinion is essential. Provoking factors must be considered. Their absence suggests a poor prognosis.

Significant adverse factors are:

- Unavoidable concomitants of aviation eg, strobe lights, propeller flicker, fatigue
- Difficult to avoid eg, menstruation.

Provoking factors that are avoidable or insignificant in context of aviation are:

- Alcohol excess and/or withdrawal
- Sleep.
These should be considered with regards to risk of occurrence in the absence of such factors.

Individuals with established epilepsy, ie, more than one unprovoked attacks, are unfit for aviation medical certification. Persons who have experienced seizures but who are not diagnosed as epileptic may be deemed to meet the medical standard.

**Partial (Simple or Complex) Seizures without progression to Generalise Seizures**

The term Partial Seizure often misleads patients to consider the condition is not as significant as the classical Grand Mal Seizure. Careful counselling of patients should include the explanation that such terms are anatomical and electro-physiological distinctions. The functional effect of impaired conscious state and/or brain activity is equally as significant as in other epilepsy.

**Sleep (Nocturnal) Epilepsy**

Epilepsy that occurs only when asleep is distinguished from sleep disorders such as Sleep Behaviour Disorder, Sleep Apnoea etc. Such disorders must be excluded. Sleep EEG recordings—best with video recording (if possible), will confirm the diagnosis.

The condition is associated with increased risk of seizure when awake ie, progression to the more “classical” type of epilepsy. This risk is increased when the condition is untreated.

Since aircrew and air traffic controllers are not performing flight-related duties when asleep, sleep as a provoking factor is not relevant in the aviation context. When the condition responds to anticonvulsants, the risk of such a seizure during flight related duties is further reduced.

Prior to certification, the effect of anticonvulsant control failure or “breakthrough” must be considered. Expert neurological opinion should be sought to determine if such a control failure occurs. The first presentation may be recurrence of sleep epilepsy or epileptic seizure whilst awake. Recurrence that first presents as fits whilst awake poses a flight safety hazard.

Aviation Medicine Section assesses all cases individually.

Important indicators of less risk are:

- No further occurrence of sleep epilepsy
- Absence of significant side effects of anticonvulsant.
Childhood Seizures

Childhood febrile seizures that are brief, not associated with neurological deficits and have ceased before the age of five are not generally disqualifying. The applicant must have been off all anti-epileptic medications for at least five years and the off-medication EEG, should be normal.

The seizures of Benign Rolandic Epilepsy of Childhood usually involve the face, tongue or hand and are often precipitated by drowsiness or sleep. The EEG shows significant abnormalities from the Rolandic area. Individuals with this condition may be considered for certification if they have been seizure free and off medication for ten years. They must have a normal neurological examination and EEG. A sleep deprived EEG should also be obtained and must be normal prior to issue of any aviation medical certificate.

Petit Mal or Juvenile Myoclonic Epilepsy is seizure disorders that occur in childhood. Because such conditions may persist into or present during adulthood, they are considered as subtypes of epilepsy. These conditions are associated with a risk of progression to generalised convulsions.

The Single Epileptiform Seizure

Extreme care must be taken to diagnose epileptic seizure in the presence of a single event. Clonic movements from transient brain hypoxia or from other causes are often reported as seizures. The condition should be considered as Loss of Consciousness (see above section on Blackouts, Loss of Consciousness and Syncope). Non-epileptic causes should be sought and excluded.

An individual with a single epileptiform seizure is initially unfit for medical certification. A case may be reconsidered five years from a seizure if the following conditions are met:

- Specialist neurological examination is normal
- Repeated EEGs, including sleep-deprived EEGs, do not reveal any significant abnormalities
- Studies incorporating additional nasopharyngeal or minisphenoidal electrodes, if relevant, do not reveal any significant abnormalities
- Neuro imaging, preferably by MRI, has demonstrated normal brain structure.

For continued medical certification five years after initial certification or recertification, all of the above investigations must be repeated and reported as normal. Applicants for Class 1 certification may be restricted to "as or with co-pilot" for a further two years. Individuals who have a second seizure are considered to have epilepsy.
When a single seizure was related to alcohol withdrawal, applicants may be considered for medical certification earlier if they have a normal EEG and Neuro imaging, and psychosocial and biochemical evidence is presented that their alcohol abuse is in a continuing "recovery" phase. The alcohol abuse should be dealt with as a separate medical problem.

Those who have had a seizure while on tricyclic antidepressant drugs or other seizure enhancing medications should be considered more prone to seizures than the average population. Both neurological and psychiatric opinions should be sought to manage their interrelated problems. Psychiatric report should indicate the optimum treatment required and if alternative treatment is suitable and/or available. The neurological report should indicate the applicant’s risk of further seizures, particularly if using other psychotropic medication for psychiatric treatment.
2.5.7 Head Injuries

There are two major concerns over fitness for aviation-related duties following head trauma. One is the neuropsychological consequence of the trauma in applicants who have not had any clear focal deficits and the other is the possibility of Post Traumatic Epilepsy (PTE).

The neuropsychological consequences are secondary to the effects of acceleration/deceleration forces on the skull and brain. Because of the anatomy involved, these forces cause their greatest focal damage to the orbital, frontal and anterior temporal areas of the brain. Diffuse white matter damage may be associated with the cortical damage.

The result of such injury is dysfunction in a number of functional executive activities of the brain. Frequent effects include:

- Slowing of reaction time, impaired memory and decreased ability to maintain a high level of performance over time, particularly in settings of complex activities and choices,
- A high propensity for further mental decline with fatigue, and
- Other problems include maintaining attention, initiation and proper sequencing of tasks, difficulty in planning and anticipating, and difficulty in establishing automatic responses to a trigger.

The affected individual may not notice or care that the task is being poorly performed. Stress, fatigue and pain may exacerbate all these effects, and the handling of simultaneous emergency tasks is particularly affected.

Although the effects of head trauma may be severe, routine IQ and mental status testing may be within normal limits. Fortunately there is a natural tendency for neurological deficits to improve with the passage of time. There are a number of ways to predict the outcome of a head injury. The most commonly used is the duration of post-traumatic amnesia (PTA). Serial sequential neuropsychological tests separated by months or years can document changes associated with improvement of neurological deficit. A pre-trauma baseline test of such nature will provide the ideal reference but is not usually available.

The limitations of neuropsychological testing should be recognised eg, learning; subjective interpretations by the tester, interface issues (particularly if computer-based) and its results should be interpreted with these limitations in mind.
Mild Brain Injury

This is characterised by:

- Transient loss or alteration of consciousness without any focal neurological deficit and with rapid return to alertness and orientation
- Post-traumatic amnesia (PTA), which occurs when a person is conscious but ongoing events are not recorded in the memory. The duration of this lapse must be less than one hour; and
- Post-traumatic syndrome (PTS) which comprises a symptom complex involving:
  - Dizziness
  - Emotional impairment
  - Intellectual impairment, and
  - Headache.

Applicants with mild brain injury are generally considered to be fit to fly unless there is a history of PTS, which takes more than six months to resolve.

Any alteration of consciousness associated with head trauma is a sufficient indicator of likely brain injury that flying should not be undertaken for at least two weeks — the period during which "early" post traumatic epilepsy is most likely to occur.

Even in the absence of other risk markers or of a neurological deficit, a more prolonged loss of consciousness and its associated post-traumatic amnesia should be followed by longer periods of suspension from aviation related duties, as follows:

<table>
<thead>
<tr>
<th>PTA</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 HR</td>
<td>1 month</td>
</tr>
<tr>
<td>1 HR - 24 HRS</td>
<td>3 months</td>
</tr>
<tr>
<td>&gt; 24 HRS</td>
<td>At least 1 year</td>
</tr>
</tbody>
</table>

In all cases, formal confirmation of neurological fitness should precede a return to flying and referral to the Aviation Medicine Section for a final decision is required.

Moderate and Severe Brain Injury

The significant factors in the assessment of head injuries, which produce moderate or severe brain injury, are:

- Extent and nature of any neurological deficit
- Risk of post-traumatic epilepsy (PTE).
2.5.8 Post-Traumatic Epilepsy Markers

A past history of febrile convulsions in childhood and/or a family history of epilepsy doubles the risk associated with any other markers.

Early post-traumatic epilepsy that occurs within the first week following injury carries a 25% risk of later epilepsy. Convulsive movements that accompany an impact head injury do not increase this risk. However, any convulsive activity following the immediate effects of impact, however shortly thereafter these occur, should be considered as "early post-traumatic epilepsy".

Demonstrated haemorrhage within the brain substance, particularly the cortical part, is associated with 25-45% risk of PTE. Depressed fractures or presence of blood in the subarachnoid space are not reliable guides to risk of PTE. However, the presence of such findings should alert investigators to search for bleeding within the brain substance.

Both CT scan and MRI are desirable in assessment of such bleeding. Availability dictates which test is performed. MRI has the advantage of being able to grade breakdown products from blood and can be very sensitive for late imaging where no initial CT or MRI was performed. Where possible an initial CT and/or MRI should be performed. If the history suggests a severe head injury and no initial imaging available a MRI should be performed to detect residual changes associated with bleeding within the brain substance.

A normal MRI should be reassuring.

Other markers are the presence or absence of a post-traumatic amnesic interval of more than twenty-four hours, focal signs, and early post-traumatic epilepsy.

Once the first post-traumatic week (the period of early PTE) has passed, the risk of subsequent PTE decays exponentially. By two years, the residual risk is less than 20% of that immediately post-injury and at four years it is less than 10% of that initially present.

When considering recertification, a residual risk of PTE of 1% or less is acceptable, given that the prevalence of epilepsy in the community is 0.33%.

Conditions that require careful assessment and which most commonly result in a "fail" assessment are: epilepsy, intracerebral haematoma, persisting CSF fistula, primary open cerebral laceration, and the presence of any significant permanent neurological deficit.
Recertification Guidelines

The Aviation Medicine Section applies the following guidelines:

1. Applicants with PTA lasting 30 minutes or less, who after the event have a normal neurological examination and no sequelae, may return to full duties in three to four months if the CT scan is normal.

2. Applicants with PTA from 30 minutes to 24 hours, with a normal MRI and EEG, are acceptable after 12 months. If a seizure occurred in the first week after trauma in an adult, a longer interval before re-licensing is required. Such cases are assessed individually.

3. If there is PTA greater than 24 hours, but Neuro imaging and neuropsychological testing are normal, applicants can be declared fit after two years. Flight simulator testing may provide additional valuable information in these cases.

4. Applicants with head injuries associated with intracerebral haemorrhage or focal deficit, whose neuropsychological testing does not show significant sequelae at 5-7 years post trauma, may return to duties after 7 years. Those who demonstrate abnormal neuropsychological sequelae have been more seriously injured and are considered individually. MRI is essential to determine presence or absence of bleeding.

5. Use of an anticonvulsant may mask the presentation of any PTE. The duration of the seizure free period should be considered as beginning only when applicant is off anticonvulsant medication. Where the risk of further seizures is considered to be too high to cease medication, the applicant is not medically fit for certification.

2.5.9 Neurosurgery

Opening the skull is not necessarily a permanently disqualifying factor for flight crew or ATC certification.

Assessment is based on:

- The underlying disease and its prognosis
- Any neurological deficit
- Surgical approach and any associated induced injury to the brain substance along the approach path
- Any risk of post operative epilepsy secondary to destruction or removal of cerebral tissue
- Location of the supratentorial/infratentorial lesion.

Full reports are required in all cases. DAMEs should issue a "doubtful" assessment and provide explanatory notes.
2.5.10 Cerebrovascular Diseases

These pathologies are usually secondary to or associated with other medical conditions and these should be sought and controlled besides dealing with the presenting cerebrovascular events. Investigations are more informative regarding the causes than the history alone. Imaging by CT scan, MRI or Angiography will differentiate the various types. Other investigations such as lipid profile, stress test for coronary ischaemia, ultrasound of carotid and heart, digital subtraction angiography etc should be considered to address non-cerebral conditions. The treatment of these non-cerebral pathologies may introduce factors affecting aeromedical certification, eg, use of an anticoagulant.

Specialist neurologist assessment is mandatory. Opinion should specifically include the risk of:

- recurrence
- epilepsy
- subtle or acute incapacitation.

Such assessment should be supported by reference to current literature with reasoned opinions.

Where subtle functional changes are suspected, neuropsychological testing to quantify the changes should be undertaken. These tests can be expensive and are open to varying interpretations.

Ischaemia

Assessment of transient ischaemic attacks (TIAs) and reversible ischaemic neurological deficits (RINDs) depend upon their causes.

- **Stenosis.** Although stenotic lesions may be bypassed or treated by endarterectomy, the risk of continuing TIAs and cerebral infarction remains high.

- **Embolism.** The risk of recurrent embolism or of haemorrhage secondary to anticoagulation is high.

- **Postural.** Individual assessment is required, but most instances are related to head movements necessary for flying.

- **Vascular headache.** See earlier section on Headache.

- **Blood hyperviscosity.** This condition may be due to polycythaemia, myelomatosis, Waldenstrom's macroglobulinaemia, etc. These cases are assessed individually and usually result in "fail" assessments if the hyperviscosity cannot be controlled.

- **Hypertension.** If adequate control is established with the use of suitable drugs, these applicants may be considered fit.
All precipitating or associated pathologies should be addressed and separate reports relevant to them included.

Aviation Medicine Section assesses all cases individually.

**Haemorrhage**

There are two major types of cerebral bleeding:

- Intracerebral haemorrhage, producing cerebral infarction
- Subarachnoid haemorrhage.

Most cases are secondary to leakage or rupture of an aneurysm; some are secondary to arterio-venous malformation. Surgery to treat them may cause injury to brain matter with associated post-operative epileptic risk. Details of the surgery should be included in reports.

20% have no identifiable cause but may be related to sustained hypertension or to transient elevation of blood pressure.

All affected patients are at risk of later developing normal pressure hydrocephalus with visual field loss and corresponding subtle incapacitation. This possible complication should be looked for and excluded as part of the follow up of all affected applicants.

Aviation Medicine Section assesses all cases individually.

**Cerebral Infarction**

Applicants who have suffered a cerebral infarct are generally considered unfit for at least one year. Recertification depends on:

- Underlying pathology leading to the stroke
- Absence of neurological deficit
- Risk of recurrence
- Assessed risk of future seizures.
2.5.11 Infections of Central Nervous System

Meningitis

All applicants diagnosed with meningitis should not engage in flight duties for six months. Return to flight duties depends on the nature of the infecting agent or cause of meningitis, e.g., viral, bacterial or fungal, and the degree of recovery of resultant deficit and risk of development of epilepsy or hydrocephalus.

Encephalitis

This is dealt with as for meningitis.

Brain Abscess

Assessment is based on the underlying cause and whether the lesion is:

- Supratentorial, in which case the risk of epilepsy and the degree of deficit must be considered, or
- Infratentorial, where the nature and degree of deficit must be considered.
2.5.12 Degenerative Disease

**Dementia**

Dementia is defined as deterioration in cognitive abilities that impair the previously successful performance of activities of daily living. The examining doctor is in a better position to assess an applicant with possible dementia if there has been contact over some years and changes over time can be more readily appreciated.

Memory loss, particularly short term, is most common and tends to affect executive function. (Planning, initiation and regulating behaviour for systematic, goal-directed activity. It is highly involved in novel situations where long term memory “experience” is not adequate).

In the aviation medical examination, presentation of dementia tends to occur at early stage in the process, with consequently difficult diagnosis. Pathologies that cause secondary dementia should be sought and excluded before a diagnosis of primary dementia is made. Age of onset is not a reliable guide. With aging, frequency of all pathology increases. Dementia, primary or secondary, is one of the many manifestations of increasing age. In the absence of pathology, even advanced age is not a reason for refusal of medical certification.

In early dementia, diagnosis usually is made by exclusion. Where a positive finding is present eg, brain atrophy on CT scan, the diagnosis is more likely. However, the absence of such findings does not preclude the diagnosis. Investigations should be guided by pathologies that produce secondary dementia.

Clinical examination can be formal or informal. Abnormal performance of tasks such as form completion, or following simple instruction such as undressing should be recorded. Mini-Mental State Examination has limitations because of its dependence on the applicant’s linguistic ability, educational level and cultural background, particular in the early and late stages of the condition. Other reasons for poor test performance should be carefully considered before the result deemed positive. If test performance is normal, the presence of dementia is unlikely.

The greatest diagnostic challenge occurs where formal tests appear normal yet a family member or the examiner’s prior knowledge of the applicant indicates the presence of changes in mentation sufficient to cause concern. A flight performance report from instructors should be sought. Formal flight test may be necessarily. Assessment of flight performance must take account of the pilot’s experience and currency. Highly experienced pilots may perform adequately even when mildly impaired. Comparison with previous performance or with that of other pilots’ with similar experience should be sought.

Many dementias are progressive but some may be static. Where dementia has been demonstrated to be progressive, an immediate "fail" assessment is likely.
2.5 Neurology

Note: If dementia is secondary to metabolic disease or correctable organ failure, there may be significant recovery of mental function following effective treatment. Aviation Medicine Section assesses all cases individually.

Normal Pressure Hydrocephalus

Treatment is not effective in preventing progression and subtle incapacitation may develop even in the presence of a working shunt. Assessment will be "fail".

2.5.13 Extrapyramidal Disease

Parkinsonism

This is characterised by:

- Rigidity
- Bradykinesia
- Tremor—although a "resting" tremor eases with movement, stress may produce a "reversal" with worsening of tremor on movement.

Parkinsonism can be a manifestation of other diseases and such causes should be sought and dealt with. Parkinson’s disease is a chronic, progressive disorder of primary Parkinsonism with no evidence of more widespread neurological involvement.

The functional effects of Parkinsonism can be variable. A careful record of neurological deficits, including effect on common activities, should be made. This will serve both as a quantitative appraisal tool and for comparison in evaluating subsequent progression of the condition.

A flight test is an essential component of evaluation. It should be the last of the tests performed and does not replace clinical assessment.

Applicants may be assessed as fit for certification if there is no adverse effect of treatment such as postural hypotension or "on-off" phenomena, and if the following features are adequately controlled:

- Bradykinesia
- Rigidity
- Tremor
- Adjustment of centre of gravity
- Voice quality
- Rapid scan eye movement.
Significant sequelae relevant to aviation safety include:

- Altered colour vision
- Dementia (late phenomenon)
- Depression (early as reaction to diagnosis, or later as a primary phenomenon)
- “On-off” phenomenon: abrupt but transient fluctuation in clinical state within the day, often as complication of levodopa therapy.

Progression to incapacitating symptoms or signs is generally slow. Shortened validity of certification is required to facilitate monitoring of changes. Class 1 certificate holders may require 6-monthly review and restriction to duties ‘as or with co-pilot’. All classes of medical certificate holders will require neurological review at least annually.

Applicants receiving treatment who display "on-off" phenomena will not be certificated to continue flight duties due to the likelihood of rapid onset of incapacitation within the time period of a typical flight.

### 2.5.14 Demyelinating Disease

**Multiple Sclerosis (MS)**

MS is characterised by multiple episodes of demyelinating attacks within the central nervous system. Diagnosis cannot be made following a single attack unless confirmed by MRI changes. A single attack with a single lesion on MRI does not confirm the diagnosis. Multiple lesions in the clinical setting of single attack may be consistent with the diagnosis.

The course of the disease can be relapsing-remitting or progressive. In the relapsing-remitting type some patients may remain static for many years while some will relapse at variable frequency. Favourable prognostic features are: isolated optic neuritis or other sensory change, complete recovery, age of onset younger than 40 years, female, fewer than two relapses in the first year of illness and minimal impairment five years after the first presentation.

Progressive type of MS has a 50% probability of functional deficit in daily life activities requiring assistance at 10-15 years from initial diagnosis.

Typical attacks in mild cases have onset over days rather than minutes. However in severe cases, attacks can present as an acute neurological event. Seizure is uncommon.
In all cases, assessment depends upon:

- Nature of symptoms
- Time between exacerbations
- Residual deficit
- Likelihood of sudden incapacitation
- Activity of the disease.

A flight test may be necessary to determine the effect of any residual deficit.

All cases of MS require formal neurological opinion. Aviation Medicine Section assesses all cases individually.

Any subsequent certification will require regular specialist reviews.
2.5.15 Intracranial Tumours

(See also Section 2.14 – Malignancy.)

Three factors affect the aeromedical disposition of applicants with intracranial tumours:

- Malignant or benign
- Treatment modality: chemotherapy, radiotherapy, surgery
- Degree of brain involvement.

Certification of applicants with secondary malignant brain tumours is principally a function of the characteristics of the primary tumour.

Certification of applicants with primary malignant brain tumours depends on prognosis in terms of malignancy and sequelae of any treatment received.

Certification of applicants with benign brain tumours depends on tumour size and location and the effect of any treatment.

**Radiotherapy**

Whole brain irradiation may be associated with late radiation injury effects. Focal irradiation may cause residual changes demonstrated on MRI. Such complications should be monitored for and excluded.

**Chemotherapy**

Systemic effects have to be considered in any aeromedical assessment.

**Surgery**

Effects occur regardless of the tumour’s malignancy. For tumours within the brain, aeromedical concerns are for brain substance loss, with associated neurological deficit, and surgically induced bleeding into brain substance, with associated post-“traumatic” epilepsy.

Essential factors for consideration are:

- **Site of tumour:** supra or infratentorial
- Surgical approach
- Details Of The Surgery: amount of intraoperative bleeding, retraction and compression of brain, and any intraoperative difficulties or complications.
The treating neurosurgeon’s report and opinion on the risk of epilepsy is a mandatory requirement for aeromedical assessment and must include:

- Details of any neurological deficit from brain substance loss or as result of surgical approach
- Risk of epilepsy
- Risk of recurrence of tumour.

Benign tumours not involving brain substance such as meningioma or acoustic neuroma should be considered in terms of:

- Treatment used: radiation and/or surgery
- Severity of compression effect on underlying neural structure: brain or nerve. In respect to brain compression, the potential for epilepsy should be considered.

A report from the specialist involved is required in all cases.

The effect of different treatment combinations and their likely sequelae requires expert neurological opinion on the particular therapy.

If there is no significant neurological deficit, these applicants may be assessed as fit for pilot and ATC duties. Applicants with small tumours, with no significant deficit after treatment by cryotherapy, after which there has been no evidence of epilepsy, may be assessed as meeting the required medical standard or as posing no significant risk to the safety of air navigation.

Applicants with history of childhood cerebellar astrocytoma who have been cured and who have no deficit or history of epilepsy may be assessed as meeting the required medical standard or as posing no significant risk to the safety of air navigation.

For adult subtentorial tumours, Aviation Medicine Section assesses all cases individually.

Nasal approach to pituitary tumours has a low risk of sequelae; the primary aeromedical consideration is endocrine effect and any residual compression effect on the optic nerves.

Malignant tumours fully excised, with or without associated radiotherapy, are considered according to their potential for recurrence, effect of the treatment, and their associated seizure risk. Those treated by radiotherapy alone will require long period of observation, usually in order of years, before the condition can be considered cured. Early certification is unlikely.

Applicant with benign tumours treated by radiation alone will be considered individually, dependent on the siting and any residual pressure effects on surrounding structures.

Benign intraventricular tumours will be considered individually, with any neurological deficit resulting from the surgical approach the main consideration.
2.5.16 Extracranial Neurological Disease

*Peripheral Nerve Diseases*

These disorders are assessed on the basis of the nature and degree of deficit. Autonomic involvement may produce syncope and is generally regarded as incapacitating. Full reports are required.
2.6 Psychiatry

2.6.1 Introduction

This section details the assessment procedures for pilots, other aircrew members and air traffic controllers (ATC) who suffer or who may suffer from psychological disorders or psychiatric disease.

The aim of the psychiatric assessment within the aeromedical examination is to ensure that applicants do not suffer from psychological disorders or psychiatric disease which places them at an increased risk of incapacitation, which may produce a decrement in psychological or higher cortical function, or which may jeopardise the safety of air navigation. A particular concern is the potential for an affected individual to commit an unsafe act that impairs the safe operation of an aircraft.

When conducting the aeromedical examination, the DAME should recognise that an individual who holds an unrestricted medical certificate must be capable of safely performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities (either as a private or a professional pilot) may include flight:

- For prolonged duration, often as part of a shift roster
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning
- Subject to disrupted sleep and time zone changes.

A number of these stressors may also affect Air Traffic Controllers.
2.6.2 The Psychiatric Standard – CASR Part 67

CASR 67.150 For medical standard 1
CASR 67.150(7)
Table 67.150
3.4 – 3.6

CASR 67.155 For medical standard 2
CASR 67.155(7)
Table 67.155
2.4 – 2.6

CASR 67.160 For medical standard 3
CASR 67.160(7)
Table 67.160
3.4 – 3.6
2.6.3 Psychiatric Assessment

All applicants for Australian aviation medical certificates are required to complete a comprehensive screening questionnaire, to be physically examined by a DAME, and to undertake a number of screening tests.

When conducting the psychiatric component of the aeromedical examination, the DAME should note the presence of relevant risk factors for the development of psychiatric disease and the presence of signs and symptoms suggestive or diagnostic of such conditions. (A Generic Template for an Aviation Psychiatric History is being developed to guide the conduct of an aviation medical psychiatric assessment and will be provided in due course.)

For example, risk factors for the development of alcoholism include:

- Family history of alcohol abuse
- Family or work stresses
- Financial pressures
- Single marital status.

Psychometric testing may assist in making a psychiatric diagnosis and referral to a consultant psychiatrist may be indicated to confirm a diagnosis or to resolve concern over a differential diagnosis. CASA may require a pilot or an ATC to be assessed by a consultant psychiatrist as part of its consideration of an applicant’s fitness for aeromedical certification.
2.6.4 Documentation of Psychiatric Conditions

Psychiatry is a subjective science. DAMEs need to take a careful and thorough clinical history before reaching a psychiatric diagnosis, particularly a diagnosis that may have significant occupational implications for pilots or ATCs. The Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations is provided to assist DAMEs in taking such a history and to bring consistency to their reporting.

In addition to requiring a traditional narrative report of psychiatric illness in aviators, CASA will henceforth require DAMEs and consultants to classify psychiatric conditions in aircrew and ATCs in accordance with the criteria defined in the Diagnostic and Statistical Manual of the American Psychiatric Association (DSM IV). Use of the DSM system will provide CASA with a tool to ensure the uniform assessment of all aircrew and ATCs diagnosed with psychiatric disease and allow CASA to make an informed assessment of the aeromedical risk posed by a particular applicant with a psychiatric condition.

DSM IV categorises psychiatric disorders and disease along several axes:

- Axis I - Clinical syndromes
- Axis II - Developmental Disorders/Personality Disorders
- Axis III - Physical Disorders and Conditions
- Axis IV - Severity of Psychosocial Stressors
- Axis V - Global Assessment of Function¹.

The first three axes constitute the diagnostic assessment of a patient with a psychiatric condition. Conditions in Axis I (and to a lesser extent Axis II) are those most likely to be of aeromedical concern in the flying safety context. Axis III permits the clinician to indicate any current physical disorder or condition that is potentially relevant to the understanding or management of the case. (These are disorders or conditions listed outside the mental disease section of ICD 10).

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¹ CASA does not require an Axis V assessment. An amended assessment scale for assessing function in Aviators is under consideration.
Axis IV provides a scale for coding the overall severity of the psychosocial stressor(s) acting upon the patient that have occurred in the year preceding the current evaluation and that may have contributed to the development, recurrence or exacerbation of a mental disorder. The rating of severity of the stressor should be based on the clinician’s assessment of the stress an “average” person in similar circumstances and with similar socio-cultural values would experience from the particular stressor(s). Clinicians should also make an assessment as to whether the stressors are acute (less than 6 months) or enduring (greater than 6 months).

Axis V permits the clinician to indicate an overall judgement of a person’s psychological, social and occupational functioning (as an aviator or ATC) on a scale that assesses mental health-illness. Two ratings should be made using this scale; the first an assessment of current function and the second an assessment of best function during the preceding 12 months.

Thus, for example, a DAME reporting on an airman with psychiatric illness may summarise his condition as follows (in addition to providing a narrative of the situation):

Axis I: Major depression: single episode, severe, without psychotic features
   Alcohol dependence
Axis II: Dependent personality disorder
Axis III: Alcoholic cirrhosis of liver
Axis IV: Stressors: anticipated retirement; grounded by company; change of residence; loss of contact with friends
Axis V: (Not required by CASA at present.)
2.6.5 Disorders Diagnosed in Childhood

**Mental Retardation**

This disorder is characterised by significantly sub-average intellectual function with concurrent deficit or impairment in adaptive functioning. Onset is before the age of 18 years. Where the results of standardised, individually administered intelligence tests indicate significant reduction in an applicant’s intellectual performance likely to limit the individual’s ability to control an aircraft and where clinical assessment indicates a deficit in adaptive behaviour, CASA will not issue a medical certificate.

**Learning Disorders**

Learning disorders are diagnosed when an individual’s achievement on individually administered, standardised tests in reading, mathematics or written expression are substantially below that expected for age, schooling and level of intelligence and when such deficits interfere with academic achievement or activities which require such skills. CASA will not issue a medical certificate to an applicant who has a learning disorder that precludes the acquisition of knowledge and information essential to safe flight.

**Motor Skills Disorders**

The essential feature of this group of disorders is a marked impairment in the development of motor coordination sufficient to interfere with academic achievement of activities of daily living. Recognition of this disorder usually occurs in childhood. Clinical course in variable, and in some cases, lack of coordination continues through adolescence into adulthood. In general, CASA will not issue a medical certificate to an applicant who suffers an impairment of motor skill sufficiently severe to threaten the safety of flight.

**Communication Disorders**

CASA will not usually issue a medical certificate to an applicant who suffers a communication disorder severe enough to compromise effective communication in the aviation environment. Practical testing may be required to establish the effectiveness of an applicant’s communication abilities.
Pervasive Development Disorders

These disorders are characterised by severe and pervasive impairment in several areas of development relative to an individual’s developmental level or mental age. Autistic Disorder is the commonest of these disorders. The essential features of an individual with this disorder are impairment in reciprocal social interaction (which is gross and sustained), impairment in communication skills and markedly restricted repertoire of activity and interests. The symptoms and characteristics of autism can present in a wide variety of combinations, from mild to severe.

Other conditions in this group include Rett’s Disorder, Asperger’s Disorder and Childhood Disintegrative Disorder.

Sufferers of disorders in this group will usually be precluded from holding CASA medical certification.

Aeromedical Management Protocol in Attention Deficit Hyperactivity Disorder (ADHD) – Draft Guidelines

Background

Attention and aviation

Aviation is a dynamic environment – it is often necessary to share attention between several information sources such as:

- Make and respond to radio transmissions on multiple frequencies (area/aerodrome)
- Controlling the attitude and flight path of the aircraft
- Navigating
- Dealing with emergencies
- Checklists
- Weather
- Traffic avoidance
- Fuel control
- Flying instrument approaches.

An inability to fully concentrate may lead to a lack of situational awareness – which has been defined as a contributing factor in many accidents and incidents.
**Nature of ADHD**

ADHD is a disorder characterised by maladaptively high levels of impulsivity, hyperactivity and inattention:
- ‘Impulsivity’ signifies premature and thoughtless actions
- ‘Hyperactivity’ a restless and shifting excess of movement
- ‘Inattention’ is a disorganised style preventing sustained effort.

ADHD is distinguished from the normal range by the number and severity of symptoms and their association with significant levels of impairment.

Areas of neuropsychological deficits in ADHD include:
- Planning
- Vigilance
- Verbal and spatial working memory
- Moment-to-moment variability and inconsistency in performance
- Selective attention (focused attention, integration of sensory information)
- Impaired continuous performance tasks
- Distractibility
- Memory
- Reaction time
- Information processing speed
- Flexibility
- Motor speed
- Visuomotor ability.
Co-morbid or differential psychiatric diagnoses are common and may include:

- Depression
- Anxiety
- Conduct disorder
- Oppositional defiant disorder
- Personality disorders
- Bipolar disorder.

Automobile accidents are more common among those with ADHD, and may be associated with a higher rate of fatality.

Young drivers with ADHD are:

- Two to four times more likely to have traffic accidents
- Three times as likely to have injuries
- Four times as likely to be at fault
- Six to eight times more likely to have their license suspended

**Diagnostic Criteria**

In Australia, diagnosis is based on DSM-IV criteria which list 18 symptoms - 9 inattentive, 6 hyperactive, 3 impulsive, of which 6 inattentive and/or 6 hyperactive/impulsive symptoms are required for diagnosis. The symptoms must have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level, and some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years. Some impairment from the symptoms must be present in two or more settings (e.g., at school [or work] and at home), and there must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.

There are various rating scales available which may be useful in diagnosis and monitoring, however they should not be used solely to make a diagnosis.

Studies on the use of quantitative EEG (QEEG) have suggested some abnormalities that correlate with the diagnosis of ADHD, but again these tests do not replace a thorough assessment against DSM-IV.

Studies of neuropsychological testing in ADHD show that treated patients perform better than untreated patients, and patients improve on tests after they are treated, however treated patients are still significantly impaired compared with normal controls. However, there is debate as to the applicability of neuropsychological testing in the natural environment.
ADHD in Adults

There is evidence from follow-up studies that ADHD persists into adulthood in around 30% of cases. In general, symptom intensity decreases, hyperactivity becomes less apparent but the difficulties with impulsivity and attention are persistent. As such most adults with the condition will not meet the full criteria under DSM-IV, even though impairing symptoms may persist.

Markers of remission of ADHD

There are few studies or recommendations regarding the determination of remission. It is generally recommended that pharmacological treatment be episodically halted during childhood and adolescence to assess the clinical condition. Most treatment is tapered off in early adulthood or late adolescence, often related to the cessation of high school education. Ongoing treatment may be necessary in some. In others, ADHD sufferers may gravitate towards occupations less demanding on focus and attention. In addition there is generally poor handover from childhood to adult services.

Pharmacological treatment of ADHD

The Pathophysiology of ADHD is related to dysregulation of dopamine and noradrenaline circuits, and medications used to treat ADHD increase the availability of these neurotransmitters.

Dexamphetamine and methylphenidate are both stimulants and are available in both immediate and modified release preparations. If doses are missed, the relatively short duration of action of these medications mean that recurrence of symptoms and impairment is inevitable. In ADHD patients these medications help to settle associated symptoms. In normal individuals, stimulants produce euphoria and hyperarousal and impair the ability to perceive and recognise fatigue.

Characteristics of ADHD that are of significance in the aviation environment include:

- The attentional deficits that may impair situational awareness
- Impairment of decision making capabilities
- Distractibility
- Impairment of processing speed.
Aeromedical Disposition in ADHD

Classification of disposition

The disposition of aircrew with a past or current diagnosis of ADHD is considered on a case by case basis, however as a general rule:

- Those with a current diagnosis and symptomatic of ADHD on no treatment are ineligible for certification due to the concern around impairment.
- Those with a current diagnosis and symptomatic of ADHD taking pharmacological treatment are ineligible for certification also due to the concern around impairment combined with the issues around pharmacokinetics and pharmacodynamics of the medications used, and the use of medication as a proxy measure of severity.
- Those with ADHD in remission on no treatment may be eligible for certification provided there is no evidence of ongoing activity of the condition.
- Those with a diagnosis of ADHD but with no objective evidence of current symptoms or dysfunction but still on treatment are ineligible for certification due to the concerns of the adverse effect of stimulants on non-impaired individuals.

Information required for application

To consider an individual with a history of ADHD, no longer taking medication for certification, the following information is required:

- Copies of medical records from date of diagnosis to the present
- Copies of records from Medicare detailing consultations and prescription of medications
- An up to date assessment by the treating paediatrician or psychiatrist if available detailing:
  - History of condition
  - Precise confirmation of the diagnosis with reference to DSM-IV criteria
  - Co-morbidities, including drug and alcohol use
  - Requirement and response to treatment
  - Current clinical status with respect to DSM-IV criteria
  - Current functional status, with reference to collateral information if available from school, family, workplace etc.
2. Medical Aspects
2.6 Psychiatry

• Completion by the paediatrician/psychiatrist and the chief flying instructor of a questionnaire regarding symptoms in the context of and noting the implications to both the normal day to day life and the conduct of aviation

• Copies of academic records and employment history

• Copies of traffic infringements and criminal records

• Copies of any special investigations performed such as QEEG or neuropsychological testing.

The information provided will be considered by CASA, and if necessary, by an independent psychiatrist.

Requirements for applicants taking ADHD medications

Applicants will not be considered for certification unless they have ceased pharmacological treatment for a minimum of 6 months. This is because:

• DSM-IV criteria require a time frame of at least 6 months of symptoms before a diagnosis can be made – it is therefore reasonable that a period of 6 months without symptoms is required to be satisfied that the condition is no longer active.

• The measurement of impairment in occupational and psychosocial domains would not be evident immediately on ceasing medication. For example, decrease in academic achievement or work performance would take some time to be made manifest.

At the end of that time, the reports as prescribed above will need to be submitted to CASA for evaluation.

Ongoing certification

Ongoing certification may be subject to annual review by a treating specialist on a case by case basis.
Conduct Disorder (Antisocial Personality Disorder of Childhood)

The essential feature of conduct disorder is a repetitive and persistent pattern of behaviour in which the basic rights of others or major societal norms or rules are violated. CASA will not usually consider certification for a medical certificate to an applicant with a substantiated history of conduct disorder.

Oppositional Defiant Disorder

The major feature of this condition is a recurrent pattern of negativistic, defiant, disobedient or hostile behaviour towards authority figures that often develops gradually in childhood and may continue into adolescence and even into adulthood. CASA will not usually consider medical certification for an applicant with a substantiated history of oppositional defiant disorder.

Tic Disorders

A tic is a sudden, rapid, recurrent, non-rhythmic, stereotyped motor movement or vocalisation. Tics may be simple or complex, may exist in isolation or be part of a condition such as Tourette’s Syndrome. Where an applicant’s tic is believed to have implications for the safety of air navigation, CASA will not issue a medical certificate. Sufferers of Tourette’s Syndrome will usually be precluded from holding medical certification.
2.6.6 Delirium and Dementia

**Delirium**

Delirium is a disturbance of consciousness, accompanied by a change in cognition that is not due to pre-existing or evolving dementia. The disturbance generally develops over a short period, and often fluctuates during the course of a day. There is generally evidence from the clinical assessment of the aetiology of the delirium which may be due to a general medical condition, substance intoxication/withdrawal, use of medication, toxin exposure or a combination of these factors.

Aviators and ATCs with acute delirium should immediately be stood down/stand down from flying or controlling duty. CASA will only consider aeromedical certification once the applicant has recovered from the delirious state, and the underlying cause of the delirium has been identified and remedied.

**Dementia**

Dementias are characterised by the development of multiple cognitive deficits (including memory impairment and one or more of the following cognitive disturbances: aphasia, apraxia, agnosia, or a disturbance of executive functioning). While dementias share a common symptom presentation they may be differentiated on the basis of aetiology.

It may be difficult to make a diagnosis of early dementia in an individual who has enjoyed a well paid and responsible position in the aviation community for many years, but who is finding it impossible to learn new skills and to retain them (e.g. changing aircraft type). Anxiety or mood disorders may co-exist. Sympathetic handling and possibly psychological evaluation may prove helpful and the latter may be necessary to exclude or establish a diagnosis of pre-senile dementia. In such cases the decision about medical certificate revalidation will need to be based upon a very careful evaluation of all clinical and occupational information.

Once an applicant demonstrates a significant impairment of memory and other cognition, he/she should refrain from exercising the privileges of the pilot or ATC licence. CASA will not usually issue an aviation medical certificate to a sufferer of dementia.
2.6.7 Mental Disorders due to medical conditions not classified elsewhere

Reserved.

2.6.8 Substance Related Disorders

This group of disorders includes disorders related to the problematic use of a drug, including non-prescription medications, prescribed medications and drugs of abuse (e.g. alcohol, cocaine), other substances (e.g. volatile solvents) and to toxin exposure. For CASA purposes, this classification does not include nicotine abuse disorder. Some prescription drugs, whilst legally prescribable, are inappropriate when used by pilots or ATCs in the aviation environment (e.g. MS Contin). The safety of medications is dealt with in Section 2.13 Medication – Drugs and Flying/Controlling. The substance related disorders are divided into two major categories: the substance use disorders (abuse and dependence) and the substance induced disorders (substance induced intoxication, withdrawal, delirium, dementia, amnesia, psychosis, anxiety, mood, sexual dysfunction and sleep disorders). CASA will not usually issue an aviation medical certificate to a pilot or ATC who suffers a substance abuse disorder or who is involved in the problematic use of drugs.

Drug Testing

Current CASA practice is to ask all applicants for aeromedical certification (original and renewal), about possible problematic use of drugs and substances. DAMEs should also look for evidence of drug or substance use/abuse in their assessment of applicants.

Applicants who admit to the problematic use of drugs/substances or whom the DAME suspects of drug/substance abuse on the basis of other history or examination findings are required to submit a urine sample for drug screening. Urine samples for drug testing purposes should be provided as part of and at the time of the DAME medical certificate examination and should be passed under the direct supervision of the DAME. The sample should then be split into two clean containers and each sealed, the applicant being offered his/her choice of samples for independent testing. The other sample is to be forwarded to the testing pathology laboratory by the DAME. (Under no circumstances is this sample to be given to the applicant). Urine drug testing required by CASA is to undertaken at the applicant’s expense.

As a minimum, urine samples should be tested for the following groups of drugs: cannabinoids, amphetamines, cocaine analogues, hallucinogens, opiates, sedatives and phencyclidine analogues. In addition, the requesting DAME should request testing for any other drug/substance that he/she suspects that the applicant may be using/abusing.

Any applicant who returns a positive urine drug screen and thus confirms his/her problematic use of drugs/substances does not meet the relevant medical standard. CASA will not issue a medical certificate unless an explanation acceptable to CASA is provided.
Alcohol Abuse/Alcoholism

A number of alcohol related syndromes are described:

- **Acute intoxication** with alcohol is a concern in the aviation workplace by virtue of the way in which it impairs psychomotor performance that may potentially lead to accidents and injury. The potential for catastrophic outcomes in the aviation environment arguably render it impossible to consider any episode of acute intoxication in a pilot on duty as “uncomplicated”. Current CARs provide specific requirements on “bottle to throttle time” for pilots and ATCS and it is intended that the new CASRs, when published, will limit the blood alcohol concentration of pilots and ATCs.

- **Harmful use of alcohol** is associated with damage to the physical or mental health of the individual; in the absence of a diagnosis of the alcohol dependence syndrome. Certain specific and severe consequences of alcohol misuse may also be diagnosed separately – notably alcoholic hallucinosis, Korsakoff’s psychosis and alcoholic dementia.

- The **alcohol dependence syndrome** is a cluster of biological, psychological and social phenomena that may be diagnosed where three or more of the following features are identified during the preceding year:
  - A strong desire/compulsion to drink
  - Difficulties in controlling drinking
  - A physiological withdrawal syndrome associated with abstinence
  - Increased tolerance to alcohol
  - Neglect of other activities due to drinking
  - Persistence of drinking despite harmful consequences.

- **Alcohol withdrawal** is associated with mild to severe symptoms, including sweating, nausea, tremor and anxiety. However, it may be associated with serious complications, including convulsions or delirium (“delirium tremens”).

- An isolated **drink driving offence** does not fulfil ICD-10 criteria for harmful use of alcohol (although it does fulfil DSM-IV criteria for alcohol abuse) and CASA will generally not take action in response to a single episode of PCA. However, such offences do indicate an increased probability that other alcohol related problems might be identified, and this probability increases still further where there have been multiple drink-driving offences committed.

**Note:** The FAA prohibits the medical certification of pilots who are convicted of two or more drink-driving offences within a 3-year period.
Medical Assessment

The experience of certain major airlines and licensing authorities is that success in rehabilitation of the alcohol dependent pilot can best be achieved by early intervention and treatment, adhering to the strict protocol outlined below. By using this program it has been possible to return aircrew to active flying within four months.

- **Immediate action.** A pilot or air traffic controller must be assessed as temporarily unfit on reasonable suspicion of:
  - intoxication whilst on duty
  - harmful use of alcohol
  - alcohol dependence
  - other alcohol related problems.

Such an assessment may be taken by the airline’s own medical officer, by the DAME or by CASA, or by a member of flight crew or operations staff.

Where a pilot is thought to be intoxicated whilst on duty, particular care and sensitivity are required and the specific action taken may depend, in part, upon the company drug and alcohol policy. However, where possible, it is important to obtain an objective assessment of the alleged intoxication at the earliest opportunity. This might involve use of a breath alcoholmeter, a blood alcohol analysis or urinary drug testing. Such procedures may only be conducted with the patient’s consent. Given that blood alcohol concentration falls fairly rapidly with abstinence, such testing should be conducted as soon as possible. Refusal of testing, and any reasons given for this, should also be recorded carefully. A period of less than 4 hours between detection and testing is considered usual.

- **Treatment and rehabilitation.** If psychiatric opinion and examination confirm “alcohol abuse with or without dependency”, then a residential in-patient program is a mandatory requirement if revalidation is to be considered. The treatment program undertaken should be directed by the treating psychiatrist and may or may not include pharmacotherapy.

Where the diagnosis is considered not to constitute “alcohol abuse with or without dependency” but where there is still a degree of concern regarding an alcohol related matter, then a less intensive treatment may be indicated. For example, such treatment may comprise a day-patient program, or outpatient counselling. The circumstances in which this may be offered must be a matter of judgement. (Arguably, heavy drinking as a cause of an elevated GGT or hypertension, but without any other complications or problems, might be an example of such circumstances.)
- **Follow-up and monitoring.** DAMEs or CASA should be advised as soon as treatment is considered necessary so that follow-up review may be arranged to commence immediately following discharge from in-patient care. The patient should be reviewed immediately after discharge from in-patient care and on-going review should be at 3 monthly intervals (or more frequently if indicated) for at least 2 years, and less frequently thereafter. Overall monitoring should continue for not less than 3 years and in most cases will continue virtually indefinitely, or until the pilot retires. This is because of the significant risk of relapse, which continues for many years following treatment. Review will require supportive, corroborative evidence of continuing abstention from the family, the family doctor and from others in close contact at home or in the workplace. At each review blood tests should be repeated as support for the monitoring process (see above).

  Continued attendance at Alcoholics Anonymous or an equivalent organisation is required in most cases. It is also desirable that a peer group member on the same aircraft fleet should act as a “buddy” to supervise the individual’s progress and report to the relevant authority at intervals.

- **Treatment goals.** Total abstinence will usually be the only acceptable treatment goal. For less serious cases (e.g. an elevated GGT with no other evidence of problems arising from alcohol consumption), an attempt at controlling drinking may be allowed, and in such circumstances in-patient treatment will not be required. However, this will be the exception rather than the rule and, in cases of doubt, in-patient treatment and abstinence should both be considered essential for recertification.

- **Certification.** At the end of the first four months of treatment, and provided that abstention is secure, the pilot may be allowed to resume his/her flying role but only in a multicrew capacity. A period of at least two years multicrew limitation will be required, assuming good progress, before solo operations will be authorised. Failure to enter the program or to maintain the protocol will lead to continued suspension of the medical certificate.

- **Recidivism.** Recidivists will usually be disqualified from holding an aviation medical certificate and will not be considered for further certification.
2. Medical Aspects
2.6 Psychiatry

Reinstatement of Aeromedical Certification

Applicants who are disqualified from holding an aviation medical certificate as a result of problematic use of drugs/substances (including alcohol) may subsequently be certified at any class provided they meet the following requirements:

a. The applicant completes a detoxification program (if relevant to the management of the drug/substance condition—eg, alcoholism)

b. The psychiatrist/drug rehabilitation specialist managing the applicant’s case assesses the applicant and provides a report confirming the applicant’s abstinence and prognosis

c. The applicant enters a program of random drug testing/performance assessment at the direction of CASA to confirm continued abstinence.

d. The applicant enters an appropriate peer support program

e. The applicant is regularly reviewed by a psychiatrist/substance abuse specialist and a report is provided to CASA 6 monthly (in the first year).

Applicants will not usually be granted medical certification within 12 months of diagnosis/disqualification for substance abuse. Applicants who have been treated for alcohol related conditions may be considered for medical certification 4 months after detoxification is complete.

Recidivism

Recidivists will usually be disqualified from holding an aviation medical certificate and will not be considered for further certification.
2.6.9 Schizophrenia and Psychotic Disorders

These disorders are grouped together as they frequently include psychotic symptoms as a prominent aspect of their presentation (“psychotic” refers to an “inability to test reality” as evidenced by the presence of delusions, prominent hallucinations, disorganised speech, disorganised or catatonic behaviour).

An established history of schizophrenia or psychotic disorder is an absolute contraindication to aeromedical certification of pilots and ATCs. Occasionally aircrew who can unequivocally be established to have experienced a temporary psychotic episode which, has ceased and is reasonably expected never to recur (e.g. psychosis secondary to an organic, toxic or metabolic cause) may be considered for certification. In such cases, certification will be based on psychiatric and other expert advice on the risk of recurrence.

Applicants and licence holders rarely inform CASA when they are diagnosed with schizophrenia or other psychotic illnesses. Such individuals may have little insight into their illness and may attempt to continue flying/controlling. DAMEs and other medical practitioners who are aware of a patient who holds a pilot or ATC licence and who is suffering from a psychotic illness should immediately notify CASA’s Aviation Medicine Section and, where appropriate, notify the medical certificate holder that this is being done. While this may be personally difficult, the risk posed to the safety of the public as well as to the individual by a psychotic medical certificate holder or applicant is such that notification of CASA is entirely appropriate. The Civil Aviation Regulations and the Civil Aviation Safety Regulations indemnify any medical practitioner who acts in good faith in such circumstances.
2.6.10 Mood Disorders

**Major Depression**

Major depressive disorder is characterised by a clinical course involving one or more episodes of major depression without a history of manic, mixed or hypomanic episodes. Major depressive disorder may have an extremely variable course with some patients experiencing episodes of severe depression separated by long periods without depressive symptoms of any sort, while other patients are entirely debilitated by their almost unrelenting condition. At least 60% of individuals who have a single episode of severe depression will experience further episodes, and 90% of individuals who have had three episodes of severe depression will have subsequent episodes. A significant aeromedical concern is the high mortality associated with this condition, as up to 15% of patients with major depression die by suicide.

However, major depression is also commonly relatively mild in its manifestation and readily treated. Assessment of the aviation risk is thus problematic and is based on considerations such as the worst state the patient has experienced during an episode and the suicide/homicide risk during their worst state. The presence of a significant risk at any time during the course of a depressive illness will be disqualifying for pilots and ATCs. A specialist psychiatric opinion should be sought in any case where there is uncertainty about patient status.

**Bipolar I Disorder (Mania with/without Major Depression)**

The essential feature of this disorder is a clinical course characterised by the occurrence of one or more manic episodes or mixed episodes. More than 90% of individuals who have an episode of mania will go on to have future episodes. Such individuals frequently suffer one or more episodes of major depression or other psychiatric co-morbidities. Completed suicide occurs in 10-15% of such patients.

Bipolar disorder is disqualifying for pilots and ATCs.

**Bipolar II Disorder (Hypomania with Major Depression)**

The essential feature of this disorder is a clinical course characterised by the occurrence of one or more major depressive episodes accompanied by at least one hypomanic episode.

Bipolar disorder is disqualifying for pilots and ATCs.
Cyclothymic Disorder (Numerous Brief Episodes of Hypomania and Minor Depression)

The essential feature of cyclothymic disorder is a chronic fluctuating mood disturbance involving numerous periods of hypomanic symptoms and numerous episodes of depressive symptoms over a period of years (where neither hypomanic nor depressive symptoms are severe or prolonged enough to meet diagnostic criteria for a manic depressive episode). Cyclothymic disorder usually begins insidiously in adolescence and has a chronic indolent course into adulthood. Approximately 15% of sufferers will subsequently develop Bipolar I or II disorder.

Dysthymic Disorder (Prolonged Minor Depression without Mania/Hypomania)

The essential feature of dysthymic disorder is a chronically depressed mood that occurs on most days for several years. Affected individuals describe themselves as being chronically sad or “down in the dumps”. During periods of depressed mood, additional symptoms of depressed appetite, sleep disturbance, low energy levels, low self-esteem, poor concentration and feelings of helplessness may be present. Up to 75% of patients with dysthymic disorder will develop major depression within 5 years.

Pilots and Air Traffic Controllers with dysthymic disorder will not be certificated while they are symptomatic. On remission of symptoms, successfully treated applicants with a good prognosis may be certificated on the basis of a report from a consultant psychiatrist that indicates that the applicant is in remission and at low risk of behaviour that may compromise aviation safety.
Use of Antidepressant Medication by Depressed Pilots and Air Traffic Controllers

CASA may, on a case-by-case basis, certificate applicants who are prescribed (and are taking) the antidepressant medications Sertraline, Citalopram and Venlafaxine as treatment for their depression. CASA is reviewing the antidepressant Moclobemide for possible approval for use by aviators and ATCs. An “as or with co-pilot” or “with direct air traffic controller supervision” condition, as appropriate, may be imposed. Pilots and ATCs taking other types of anti-depressants will not usually be considered for certification.

CASA certification of pilots and ATCs taking CASA authorised medications is conditional on:

- Such applicants being under the care of a medical practitioner experienced in the management of depression—the applicant must:
  - Be stable on an established and appropriate dose of medication for at least four weeks before returning to flying/ATC duties and exhibiting:
    - Minimal acceptable side-effects
    - No drug interactions or allergies
  - Be subject to clinical review monthly or more often, with progress reports to CASA at 6 monthly intervals (for at least the first year). The applicant may be involved in other concurrent treatment (e.g. psychotherapy).
  - Have an absence of other significant psychiatric co-morbidities
  - Have no other psychoactive medications
  - Have precipitating factors removed/controlled.
- Symptoms of depression being well controlled, without evidence of psychomotor retardation
- An absence of suicidal ideation or intent
- An absence of features of arousal (e.g. irritability or anger)
- The presence of a normal sleep pattern.

Pilots or ATCs authorised to fly or perform duties when taking Selective Serotonin Re-uptake Inhibitor (SSRI) or related antidepressant medications must cease exercising the privileges of their licences if their antidepressant medication is altered or the dose changed. Their supervising medical practitioner may return them to duty when they are assessed as stable and without unacceptable side effects.

Pilots and ATCs whose medication is being reduced must cease exercising the privileges of their licences for the entire period during which they are weaned off medication plus an additional period of two weeks. Their supervising medical practitioner may return them to duty when they are assessed as stable and without unacceptable side effects.
2.6.11 Anxiety Disorders

DSM IV has eliminated the term neurosis, and dispersed the diagnoses from this former category of disorders amongst four other headings:

- Mood disorders
- Anxiety disorders
- Somatoform disorders
- Dissociative disorders.

Because panic attacks and agoraphobia may occur in the context of any anxiety disorder as well as in association with other mental disorders, they are defined separately hereunder.

**Panic attacks**

Panic attacks are discrete episodes in which an individual experiences a sudden onset of intense apprehension, fearfulness or terror, often associated with feelings of impending doom. During these episodes, symptoms such as shortness of breath, palpitations, chest pain or discomfort, choking/smothering sensations, and fear of “going crazy” or losing control may be present. Attacks occur suddenly, may be unpredictable and usually build to a maximum within 10-15 minutes. CASA will not usually grant aeromedical certification to an individual who suffers non-specific or unpredictable panic attacks.

**Agoraphobia**

The essential feature of agoraphobia is extreme anxiety about being in places or situations from which escape may be difficult (or embarrassing) or in which help may not be available in the event of having a panic attack. The anxiety typically leads to a pervasive avoidance of a variety of situations. Such avoidance may impair an individual’s ability to work or to carry out other responsibilities. CASA may grant aeromedical certification where an applicant’s agoraphobia is unrelated to the aviation environment or unlikely to affect aviation safety adversely.

**Specific Phobia**

The essential feature of this disorder is a marked and persistent fear of clearly discernible, circumscribed objects or situations. Exposure to the phobic stimulus almost invariably provokes an immediate anxiety response. CASA may grant aeromedical certification where an applicant’s specific phobia is unrelated to the aviation environment or is unlikely to affect aviation safety adversely.
Social Phobia (Fear of Embarrassment)

This condition is marked by a significant and persistent fear of social or performance situations in which embarrassment may occur. Exposure to such situations almost invariably provokes an immediate anxiety response and may reduce an affected individual’s ability to function in social and occupational circumstances. Most sufferers of this condition avoid these social/performance situations but some may endure such situations with dread. CASA will not usually grant aeromedical certification to an individual who suffers from non-specific or unpredictable social phobias.

Obsessive-compulsive Disorder (Obsessive Thoughts and Compulsive Rituals)

Obsessions are persistent ideas, thoughts, impulses or images that are experienced as intrusive and inappropriate and that cause marked anxiety or distress. Compulsions are repetitive behaviours or mental acts whose goal is to prevent or reduce anxiety or distress. In most cases, an individual with a compulsion feels driven to perform a compulsion to reduce the distress that accompanies the obsession or to prevent some dreaded event or situation. Eventually, the sufferer recognizes that the obsession or compulsion is excessive or unreasonable but feels powerless to prevent it. These disorders may cause marked distress, be extremely time consuming or significantly interfere with an individual’s normal social or occupational circumstances. CASA will not usually grant aeromedical certification to an individual who suffers from obsessive-compulsive disorder.

Post-traumatic Stress Disorder (Non-acute Psychological Consequences of Previous Trauma)

The essential feature of Post-Traumatic Stress Disorder (PTSD) is the development of characteristic symptoms following exposure to an extremely traumatic stressor. Such stressors include a personal near death experience, witnessing the severe injury or death of another or the violent or unexpected death of a family member. An individual’s response must involve intense fear, helplessness, or horror. The characteristic symptoms resulting from exposure to the extreme stressor include persistent re-experiencing of the trauma, avoidance of the stimuli associated with the trauma, numbing of general responsiveness and persistent symptoms of increased arousal. PTSD can occur at any age and symptoms generally begin within 3 months of the precipitating event. CASA will not usually grant aeromedical certification to an individual who is suffering from acute symptoms of PTSD. Certification may be considered once an individual’s symptoms are controlled and the applicant is considered to pose no threat to the safety of air navigation.
Acute Stress Disorder

This condition is characterised by the development of anxiety, dissociative or other psychological symptoms within one month of exposure to an extremely traumatic stressor. Generally symptoms of acute stress disorder begin shortly after exposure to the stressor, peak after 2-5 days, and resolve within a month (otherwise the diagnosis should be changed). CASA will not usually grant aeromedical certification while individual is experiencing an acute stress reaction. Once the condition has resolved, return to flying or ATC duties is likely.

Generalised Anxiety Disorder

In this disorder an individual is afflicted by excessive anxiety about a number of events or activities. The symptoms occur on the majority of days and the individual finds it difficult to control the symptoms. The anxiety and worry are accompanied by one of more of the following:

- Restlessness
- Easy fatigability
- Difficulty concentrating
- Irritability
- Muscle tension
- Disturbed sleep.

Many individuals suffering generalised anxiety disorder report they have been nervous and anxious all of their lives. The clinical course is chronic and fluctuating. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.
2.6.12 Somatoform Disorders

The common feature of this group of disorders is the presence of physical symptoms that suggest an underlying physical condition, but are not explained by that medical condition. The symptoms cause clinically significant distress or impairment in social, occupational or other areas of functioning and are not intentional.

**Somatization Disorder**

In somatization disorder, the patient experiences multiple symptoms including pain, gastrointestinal symptoms, sexual dysfunction and pseudo-neurological symptoms over several years. Characteristically, this disorder begins before the age of 30 and has a chronic fluctuating course that rarely remits completely. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Undifferentiated Somatoform Disorder**

The essential feature of this disorder is the presence of one or more physical complaints that persist for six months or longer. Symptoms include chronic fatigue, loss of appetite, gastrointestinal or genitourinary symptoms. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Conversion Disorder**

This disorder involves unexplained symptoms or deficits affecting voluntary motor or sensory function suggesting a neurological or other general medical condition. Psychological factors are judged to be associated with the symptoms or deficits. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Pain Disorder**

In pain disorder, the predominant focus of clinical attention is pain. Psychological factors have an important role in the severity, exacerbation or maintenance of this disorder. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**Hypochondriasis**

This condition is the preoccupation with the fear of having, or the idea that one has, a serious disease based on a patient’s misinterpretation of bodily symptoms or functions. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.
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**Body Dysmorphic Disorder**

This condition is the preoccupation with an imagined or exaggerated defect in physical appearance (in contrast to anorexia and bulimia where the morbid focus is on body weight). CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**2.6.13 Factitious Disorders**

Factitious disorders are characterised by physical or psychological symptoms that are intentionally produced or feigned in order to assume a “sick role”. In contrast to malingering, the motivation of sufferers of factitious disorders is psychological and there is an absence of external incentive for the behaviour. Other psychiatric co-morbidities are frequently present. CASA will not usually grant aeromedical certification to an individual who suffers from this condition.

**2.6.14 Dissociative Disorders**

The essential feature of this group of disorders is a disruption in the integrated functions of consciousness, memory, identity or perception. The disturbance may be sudden or gradual in onset, and may be transient or chronic. Dissociative amnesia, dissociative fugue, dissociative identity disorder, and depersonalisation disorder are included in this group of disorders. CASA will not usually grant aeromedical certification to an individual who suffers from these conditions. Aeromedical certification may be considered should the condition resolve.
2.6.15 Sexual and Gender Identity Disorders

**Sexual Dysfunctions**

This group of disorders is characterised by disturbance in sexual desire and in the psychophysiological changes that characterise the normal human sexual response. They may cause marked distress and interpersonal difficulty. In general, these disorders are not of aeromedical concern unless the associated psychological distress intrudes on an individual's ability safely to control and aircraft or perform duty as an ATC.

**Paraphilias**

The essential feature of this group of conditions is recurrent, intense, sexually arousing fantasies, sexual urges or behaviours involving non-human objects, the suffering of oneself/others, or the non-consensual participation of others in such activities. Affected individuals are rarely self referred and usually come to attention when their behaviour has brought them into conflict with their sexual partners, society, or has reduced on their social, occupational or other areas of functioning.

Affected applicants will not usually be aeromedically certificated until the issues that brought them to attention have been resolved. Successfully treated applicants with a good prognosis may be certificated on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.

**Gender Identity Disorders**

Patients with gender identity disorder experience strong and persistent cross-gender identification and a persistent discomfort about their assigned sex. The diagnosis depends on evidence of clinically significant distress or impairment in social, occupational or other areas of functioning.

Affected applicants will not usually be aeromedically certificated until the source of the distress or impairment is dealt with, and if appropriate, gender reassignment has been completed. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.
2.6.16 Eating Disorders

**Anorexia Nervosa**

The essential features of this condition are refusal to maintain a minimally normal body weight, intense fear of gaining weight, and significant disturbance in perception of shape/size of the body. Restrictive and binging/purging subtypes of this condition are identified. Many persons with anorexia nervosa exhibit depressive symptoms, others may be obsessive-compulsive, while others may have feelings of ineffectiveness, a strong desire to control the environment, inflexible thinking, limited social spontaneity, perfectionism, restrained initiative and depressed emotional expression. While some persons recover from anorexia completely, others have a relapsing course and the overall mortality of this condition approaches 10%.

CASA will not usually aeromedically certificate applicants who are actively anorexic. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.

**Bulimia Nervosa**

The essential features of this condition are binge eating and use of inappropriate compensatory methods to prevent weight gain. Persons with bulimia also place an excessive emphasis on their body shape. They are frequently depressed or suffer mood disorders and many also meet the criteria for the diagnosis of personality disorder. The lifetime prevalence of substance abuse disorders involving alcohol or stimulants is at least 30% among persons with bulimia.

CASA will not usually aeromedically certificate applicants while they are actively bulimic. Successfully treated applicants with a good prognosis may be certified on the basis of a report from a consultant psychiatrist which indicates that the applicant is in remission and at low risk of behaviour which may compromise aviation safety.
2.6.17 Sleep Disorders

**Primary Sleep Disorders**

This group of disorders includes the dyssomnias (including insomnia, hypersomnia and narcolepsy which are characterised by abnormalities in the amount, quality or timing of sleep) and the parasomnias (characterised by abnormal behavioural or physiological events occurring in association with sleep). Of primary aeromedical concern is the failure of sufferers from these conditions to gain sufficient restorative sleep to ensure optimum alertness and cognitive function when performing duties as pilots and ATCs. Applicants for aeromedical certification will only be considered if studies confirm normal alertness during waking hours (with or without treatment). (Also see Section 2.3 Medical Aspects – Respiratory Disease.)

2.6.18 Impulse Control Disorders

The essential feature of impulse control disorders is failure to resist an impulse, drive, or temptation to perform an act that is harmful to the person or to others. CASA will not usually grant aeromedical certification to individuals who are diagnosed as suffering from such disorders.
2.6.19 Adjustment Disorders

An adjustment disorder may be identified when a person, within three months of an event or stress, develops clinically significant emotional or behavioural symptoms. Such symptoms are either greater than would be generally expected, given the nature of the stressor, or lead to significant impairment in social, educational or occupational function. Stressors may be single or multiple, recurrent or continuous, and may affect either a single person or a group. Patients with adjustment disorders may experience symptoms of depression, anxiety, or may manifest disturbances of conduct. Adjustment disorders generally have a good prognosis and usually remit within six months of the stressor or its consequences ceasing.

Pilots or ATCs should not exercise the privileges of a licence whilst suffering symptoms of an acute adjustment disorder. In some cases, a medical certificate may be suspended. Once psychiatric opinion confirms that the symptoms associated with the adjustment reaction have abated and the acute stressor has been removed or overcome, CASA will usually issue an unrestricted medical certificate.

Personality Disorders

Personality disorders are characterised by enduring patterns of thought and behaviour that deviate markedly from the expectations of a person’s culture. These patterns, which usually begin in adolescence or early childhood, are pervasive, frequently inflexible, stable over time and cause distress, social impairment and often occupational difficulties. A number of specific personality disorders are identified including: antisocial personality disorder; (impulsive, aggressive, manipulative); borderline personality disorder (impulsive, self-destructive; unstable), dependent personality disorder (dependent, submissive, clinging); Histrionic personality disorder (emotional, dramatic, theatrical); narcissistic personality disorder (boastful, egotistical, "superiority complex"); obsessive-compulsive personality disorder (perfectionist, rigid, controlling); paranoid personality disorder (suspicious, distrustful); and, schizoid personality disorder (socially distant, detached), etc.

While personality traits are unique and may enable a person to excel in a particular field, individuals with identifiable personality disorders are likely to have attitudes or perform acts that may be prejudicial to flight safety. Such individuals fail to meet CASA’s psychiatric medical standards and will usually be disqualified from aeromedical certification. Certification may be considered if specialist psychiatric opinion confirms that a pilot or ATC with a personality disorder represents a low risk to aviation safety.
2.6.20 Other Psychiatric Conditions which may be the Focus of Clinical Attention

**Suicidal Ideation or Gesture**

Suicide and attempted suicide are not psychiatric diagnoses per se, but rather symptoms of underlying psychiatric disease. Furthermore, it is uncommon for an individual to use an aircraft as a means of committing suicide.

Those who commit suicide are more often male. The act is carefully planned, precautions taken against discovery, and the method is often violent. The majority of those who suicides are suffering from a depressive disorder, many having significant social problems, and alcohol misuse is a feature in about 15% of cases. In the younger age groups personality disorders are frequently diagnosed, because they are often associated with alcohol or drug misuse, and adverse social factors. Deliberate self-harm is usually an impulsive act, committed in such a way as to invite discovery. Over dosage with minor tranquillisers, antidepressants and non-opiate analgesics is common. Frank major psychiatric illness is uncommon.

In assessing potential risk the following factors should be considered:

- A history of direct statement of intent
- A history of previous self harm
- A previous or current depressive disorder, particularly in the early phase of recovery
- Alcohol dependence, particularly with severe physical or social complications
- Drug dependence
- Social deprivation or loneliness.

Certification may be considered if specialist psychiatric opinion confirms that a pilot or ATC who has attempted or considered suicide represents a low risk to aviation safety. Applicants who have a history of multiple suicide attempts will not usually be granted a medical certificate.
Fear of Flying

DSM IV identifies as a true simple phobia the overt, unabashed, and long-standing fear of flying which usually occurs in people who are not aviators. When an experienced aviator who previously enjoyed flying presents with “fear of flying” it may represent a complex mix of more acute causes and symptoms’ presentations. In such fearful fliers, anxiety about symbolic threats may overlay a rational fear of actual risks; this may represent a reaction to a near or actual accident, or displaced anxiety from a personal crisis. If the flier is not consciously aware of the fear, the focus may be on vague or trivial somatic symptoms, presented in a setting of "I'd like to fly, but—." This attitude presents a striking clinical contrast to the more usual tendency of fliers to understate, if not actually deny, signs and symptoms that they believe may disqualify them from medical certification.

An episode of spatial disorientation or of hyperventilation in flight may trigger intense symptoms of anxiety. Loss of motivation to fly may undermine previously adequate means of coping with the true dangers of flight, particularly in professional aviators. An accident involving the flier or a friend may overwhelm mental defences against such a possibility. Interpersonal conflicts with significant individuals in a non-aviation setting (home, office) may precipitate aviation-related anxieties without any obvious connection to flying except the time of onset.

Whatever its genesis, CASA will not medically certificate a pilot who suffers symptomatic fear of flying until its causes are delineated and the fear has been successfully treated.
2.7.1 Introduction

This section details the assessment of pilots, other aircrew members and Air Traffic Controllers (ATC) who suffers or who may suffer from renal disease or from urological disorders.

The aim of the renal assessment within the aeromedical examination is to ensure that applicants do not suffer from renal or urological conditions which place them at an increased risk of incapacitation or which may produce a decrement in physiological or psychological function sufficient to jeopardise the safety of air navigation. In conducting the aeromedical examination, the DAME will recognise that an individual who holds an unrestricted medical certificate must be capable of performing all the activities and of exercising all the privileges that are permitted under the class of licence held. Such activities may include flight (either as a private or professional pilot):

- For prolonged duration, often as part of a shift roster
- In a variety of weather conditions
- Subject to extremes of temperature, humidity, atmospheric pressure, noise, vibration and acceleration
- Reliant on support services (including provision of food and water) of varying quality and reliability
- With little or no medical/health support
- With the potential for an emergency/mass casualty/survival situation to occur with little or no warning, and
- Subject to disrupted sleep and time zone changes.

A number of these stressors may also affect ATCs.
2.7.2 Urinary Standard – CASR Part 67

The urinary standards are found in the following paragraphs of CASR Part 67:

CASR 67.150 For medical standard 1 CASR 67.150(7) Table 67.150
1.19 – 1.22

CASR 67.155 For medical standard 2 CASR 67.155(7) Table 67.155
2.18 – 2.21

CASR 67.160 For medical standard 3 CASR 67.160(7) Table 67.160
3.17 – 3.20

2.7.3 Dipstick Testing

Haematuria

Urinary ‘dipstick’ testing is required as part of the routine aeromedical examination to screen for the presence of haematuria. Approximately 2-5% of the population have microscopic haematuria, but only about 0.5% who are under age 70 will have a urinary tract cancer as the cause. A positive dipstick test should be repeated, and if negative, managed expectantly. (Most of these applicants will have a minor glomerular lesion.)

Initial aeromedical management of an applicant with a persistently positive dipstick test involves obtaining phase contrast microscopy of a fresh mid-stream urine sample. The sample must be examined within two hours of being passed; thus individuals more than two hours from a suitable pathology service must travel to a location that has that capability. Because of wide variation between laboratories in reporting urine abnormalities, CASA’s relevant requirement for a ‘normal’ assessment in an applicant found to have microscopic haematuria is for three separate urine tests, all of which have less than 20,000 RBC per ml. Phase contrast microscopy of specimens with crenated cells up to 10,000 per ml, indicating a glomerular origin, are considered to be within normal limits. Cells with a ‘non-glomerular’ appearance are likely to indicate a urothelial problem.

Where there is ‘significant haematuria’ (more than 20,000 RBC per ml in any test), initial urogenital imaging is to be by Ultrasound or Intravenous Pyelogram (IVP), as some 10% of all stones are radiolucent. The requirement for further investigation should be determined on clinical grounds and on the basis of investigation results.
Proteinuria

Orthostatic proteinuria can be excluded by testing an early morning urine specimen. If an early morning specimen remains positive for protein, then a 24-hour urine protein estimation is required. Normal is <150mg protein/day.

2.7.4 Urinary Calculi

There have been no reported episodes of incapacitation involving CASA certificate holders with a known history of renal calculi. However, there have been several untoward incidents as a result of undiagnosed or unreported stone. The aviation environment may predispose aircrew to stone formation due to the low humidity environment often found in aircraft cockpits, and because of a tendency for some pilots deliberately to under-hydrate to avoid the need to urinate, particularly where there is no toilet on the aircraft.

The presence of any stone or stones in the urinary system is aeromedically significant. (For CASA certification purposes, there is no such entity as an asymptomatic stone). Renal stones as small as 1-2 mm diameter can and do cause significant symptoms. There are no reliable prognostic indicators that can determine if a stone will or will not cause symptoms, and the chance of a stone present for 10 years moving in the subsequent 24 hours is the same as it moving after being present for 10 days. The time a stone has been present is not a reliable indicator of risk.

Single Renal Stone (Passed or Removed)

In applicants who have had a single episode of renal colic, about 50% will have a repeat episode within 5-7 years, and nearly 100% within 12-15 years, unless they modify their behaviour. However, for applicants who have passed all stones or had them removed and who are able to maintain adequate urine flow (>2 litres/day), the risk of stone recurrence is the same as for the general population. Thus CASA will certificate pilots and ATCs who have experienced a single episode of renal stone disease, with successful removal or passage of the stone. In such cases, the only surveillance need be by urine dipstick at routine CASA medical examinations.

Recurrent Renal Stones (Passed or Removed)

Pilots and ATCs who have experienced recurrent episodes of renal stone disease may be recertificated once they are proven to be free of all stones in the kidney or renal tract, have normal renal function and have adopted appropriate risk minimisation behaviour. CASA will require the following annual investigations and reports in these cases:

- Plain abdominal X-ray or ultrasound
- 24-hour urine calcium and urate estimations
- Urological review.
2.7 Nephrology and Urology

2.7-4

Retained Renal Stones

Where stone material remains in the renal substance or urinary tract, CASA will not permit unrestricted Class 1 or Class 3 certification unless there are clear mitigating factors that preclude renal colic, such as a staghorn calculus, a calculus in a diverticulum, or a stone clearly embedded in the renal substance. (Further stone movement is extremely unlikely in such cases.) Pilots or ATCs with staghorn calculi many be suitable for certification, on a case-by-case basis, until stone removal, provided they are asymptomatic, their renal function is normal, and movement of the calculus is considered unlikely. CASA may entertain unrestricted certification for Class 2 applicants in similar circumstances, on a case-by-case basis, and subject to annual urological review.

Approximately 20% of patients will have residual calculi three months after undergoing Extracorporeal Shockwave Lithotripsy (ESWL). Where there is a small stone or remnant following attempted removal with ESWL, generally accepted management is to leave the stone alone. However, due to the risk of inflight incapacitation with residual stone fragment movement, it may be worthwhile to offer removal of stone remnants via flexible ureteroscopy. There is currently an approximate 50% success with this procedure, but its risks include urine extravasation, which can be extremely painful. Percutaneous nephrolithotomy (PCNL) may be a better option for pilots to ensure a stone free status.

2.7.5 Medullary Sponge Kidney

Persons with medullary sponge kidneys (MSK) tend to be chronic renal stone formers. Therefore, most applicants for pilot or ATC certification who have MSK will not be issued an aviation medical certificate of any kind. However, CASA may certificate pilots or ATCs with this condition, on a case-by-case basis, if they have a history of one episode of renal colic or fewer, and if there are no residual stones demonstrated on investigation. (Beware of the applicant with only a radiological diagnosis of MSK and no history of stones or calcification. Many such persons have only a prominent medullary blush with no adverse implications for aeromedical certification.)
2.7.6 Glomerulonephritis

**Thin Membrane Disease**

Thin membrane disease (TMB) is due to a type IV collagen genetic defect and occurs predominantly in females. It has no major health implications and is considered benign for the purpose of CASA aeromedical certification. Patients with TMB often have an incidental finding of 80,000-100,000 RBC per ml of urine, but further investigation reveals no other abnormalities. If blood pressure is normal and renal function tests are normal (including 24-hour urinary protein excretion and 24-hour creatinine clearance), CASA will accept a presumptive diagnosis of TMB and will not require further investigation. While biopsy may be offered to confirm the diagnosis of TMB, such an investigation is not required for aeromedical certification.

Where TMB is confirmed by biopsy, there is no requirement for any surveillance. In the case of a presumptive diagnosis, the result of a serum creatinine study is required with every subsequent CASA medical examination.

**IgA Nephropathy**

This condition was formerly considered to be benign, but it is now clear that it may later lead to renal failure in some persons. Risk of disease progression is greater when it is associated with hypertension, abnormal renal function test results and renal scarring, detected on biopsy. In the absence of such abnormalities, the risk of renal failure in cases of IgA nephropathy is about 1% after 20 years. The condition is of aeromedical concern because of the risk associated with subtle incapacitation due to circulating toxins produced as renal failure progresses. Rapid progression to nephrotic syndrome may also occur. CASA will usually certificate pilots and ATCs who are affected by IgA nephropathy. Required surveillance measures are:

- 24-hour urine protein estimations
- Serum albumin testing
- Renal function testing.

All of these tests are to be done at six-monthly intervals.
2.7 Nephrology and Urology

2.7.7 Nephrotic Syndrome

Many persons affected by this condition recover spontaneously, while others respond well to treatment with steroids. If immunosuppression is necessary for treatment, pilots and ATCs may not exercise the privileges of their licences until treatment is complete. CASA will consider recertification once the condition has resolved, medication has been ceased and renal function has returned to an acceptable level (defined as protein excretion <3g per day).

2.7.8 Renal Failure

For aeromedical certification purposes, renal failure is defined by biochemical markers of impaired renal function. Physical symptoms of renal failure occur late in this disease and represent manifestations of severe end stage renal failure.

The main marker of renal function is the serum creatinine level. Most persons with chronic renal impairment who have a creatinine level <200 micromol/L suffer no untoward effects. (However, DAMEs should recall that a creatinine level <200 micromol/L may evoke severe symptoms in cases of acute renal impairment). Where an applicant’s creatinine level is between 200 and 500 micromol/L, the DAME’s clinical acumen will be required to determine fitness for exercise of licence privileges. A creatinine above 500 micromol/L invariably produces untoward health effects, including:

- Slowed mentation
- Poor concentration
- Lethargy
- Gastrointestinal disturbance
- Other electrolyte disturbances
- Rapid deterioration with intercurrent illness.
Aeromedical Disposition

When there are three test results of >500 micromol/L creatinine, the DAME should advise the applicant not to exercise the privileges of his/her licence and inform CASA of the details. Following a single initial test result of >500 micromol/L creatinine, the certificate holder should be advised not to exercise privileges, and a further test arranged for 48 hours later. If the second test confirms the original result, a third test is required 48 hours later again. The DAME should inform CASA Aviation Medicine Section of the results, and CASA will usually suspend the applicant’s medical certificate. For reported creatinine levels between 200-500 micromol/L, the DAME will consider the possible effect on safe aviation of symptoms such as those listed above, and either advise the applicant accordingly or discuss the matter with CASA Aviation Medicine Section.

Acute renal impairment is usually associated with a significant insult which itself precludes a medical certificate holder from flying or controlling. Once recovered from the precipitating cause of acute renal failure, CASA will consider recertification on a case-by-case basis.

Renal Dialysis

Persons undergoing renal dialysis usually have significantly high creatinine levels, even soon after completing a dialysis session. Their electrolyte levels may be abnormal because of large fluid shifts that accompany dialysis. Consequently, persons undergoing renal dialysis may remain symptomatic for several hours following dialysis. CASA will not usually certificate pilots or ATCs with chronic renal failure who are undergoing dialysis (of any type). Very well controlled pilots and ATCs may be granted special certification, on a case-by-case basis, permitting exercise of privileges in the period between 12 and 36 hours (only) following a dialysis.

Renal Transplant

Following renal transplantation, most recipients receive immunosuppressants to prevent tissue rejection. They have increased risks of hypertension and of ischaemic heart disease, also of developing carcinoma. Some transplant recipients have minimal complications and normal renal function. CASA will not consider aeromedical certification for pilots or ATCs until 12 months following transplantation. If the applicant is then receiving standard immunosuppressant therapy, has well controlled blood pressure, and renal function is at an acceptable level, CASA, may consider recertification, on a case-by-case basis.
2.7.9 Single Kidney

If an applicant has a single kidney and this condition is developmental, renal function testing should be undertaken. If this is normal, aeromedical certification will be unaffected. If an applicant has a single kidney due to nephrectomy, the cause of the kidney’s removal must also be considered. If the underlying cause does not affect certification, then the same considerations of renal function testing and aeromedical disposition apply as for developmental variations.

2.7.10 Urinary Tract Infections

**Female**

In the young adult female, isolated urinary tract infection (UTI) is common. Investigation rarely reveals a specific cause. A small percentage of women will develop chronic or recurrent UTIs. They require investigation (including IVP) to exclude underlying anatomical causes. Some of them may need antibiotic cover for extended periods and/or post coital antibiotic prophylaxis. Female applicants receiving antibiotic treatment for recurrent UTIs are unlikely to adversely affect the safety of air navigation, and there need be no restrictions on their aeromedical certification.

**Male**

A UTI in a male usually indicates the presence of an anatomical abnormality in the urinary tract. The diagnostic yield from investigations is about 50%. Adequate investigation must include IVP and cystoscopy. Future aeromedical certification will depend on the findings from investigations.

2.7.11 Prostatitis

Acute bacterial prostatitis should be managed as an acute intercurrent illness (like UTI) and the pilot or ATC returned to duty only when fully recovered. Non-bacterial or chronic prostatitis is considered to be a form of pelvic pain syndrome, often accompanied by significant psychological overlay, analogous to the findings in Irritable Bowel Syndrome. Chronic prostatitis is often distracting and may be difficult to manage. Best pharmacological management is with anti-inflammatory and/or anti-depressant medications. CASA will determine future aeromedical certification of affected applicants on a case-by-case basis. The DAME should closely assess the psychological status of any affected pilot or ATC before making a recommendation concerning aeromedical disposition.
2.7.12 Urinary Outflow Obstruction

Benign prostatic hypertrophy (BPH) is the commonest cause of outflow obstruction in Australian males. Acute urine retention occurs in persons affected by BPH at the rate of 5-8% per annum. There is also a small risk of chronic incapacitation due to reduced renal function.

An acute retention episode may be treated by surgery, or by use of an alpha-blocker medication. Successful surgery will usually result in clearance to return to flying or controlling as soon as the applicant has fully recovered from the effects of the surgery. Note that alpha blockers may reduce G-tolerance—the more specific the drug, the better tolerated. Tamsulosin or alfalfusin are highly selective, but are seldom prescribed in Australia as they are not currently listed on the PBS. Prazosin is listed on the PBS, but is less selective than other available agents and has more side effects. Prazosin use is not compatible with agricultural or aerobatic flying, and medical certification for pilot applicants using it will contain appropriate restrictions.

2.7.13 Testicular Cancers

Also see Section 2.14, Malignancy.

Teratoma

The progress or recurrence of teratomas may be determined by use of an appropriate marker. Chemotherapy is the usual treatment and there is >90% cure rate. When the applicant has a stage A tumour and markers are normal, early return to duty may be possible. For stage B tumours, where adequate treatment requires 3-4 cycles of chemotherapy, return to duty will be delayed until at least three months after completion of chemotherapy. All such cases should be referred to CASA Aviation Medicine Section for determination of aeromedical disposition.

Seminoma

Seminomas are very sensitive to radiation, and a very low radiation dose may be curative. As there is no reliable marker available at present, surveillance can be difficult. Once treatment is complete, early return to duty may be possible. All such cases should be referred to CASA Aviation Medicine Section for determination of aeromedical disposition.
2.7.14 Prostatic Carcinoma

Prostate Specific Antigen (PSA) is a very reliable marker for progress of established prostatic cancer. However, it is unreliable as a screening test and there is still no normal range defined for it. Risk of prostate cancer against PSA may be graphed, and most laboratories recommend further investigation when a PSA is >4, but positive predictive value is poor at this level. Once PSA reaches 12, the PPV is close to 1.

In established disease, the PSA is a proxy measure of prostate bulk and of cell turnover. PSA levels >50 are associated with a significant risk of pathological fractures, cerebral and other metastases. However, applicants with prostate cancer and a PSA of <30 have a positive bone scan in <1% of cases. An applicant with PSA of <20 will have cancer mass of only a few grams, while a PSA <12 is not associated with significant risk of metastases.

Aeromedical Certification

Post-radical prostatectomy, if the operation has been successful, PSA should fall to undetectable level. If the level remains undetectable at three years post surgery, there is <5% chance of recurrence of disease. In such circumstances, applicants can be considered cured after four years. Radiotherapy now produces similar outcomes and if PSA remains at nadir levels for 3-4 years following radiotherapy, a similar assessment may be made. Usually, certification for all classes of medical certificate may be possible 3-4 months post surgery or after completion of radiotherapy. CASA will require annual follow up urological reports and PSA estimations. However, if the PSA remains undetectable five years after surgery, no further reports will be required.

Pilots and ATCs with advanced prostatic cancer and PSA >30 must also undergo bone scan as part of their required investigations. CASA will usually only contemplate certification for this group on the basis of ‘as-or-with co-pilot’ or ‘as-or-with second controller only’.

Treatment with anti-androgen therapy produces significant side effects in about 10-20% of cases, particularly lethargy. LHRH agonists may rarely cause a chronic confusional state. Prior to return to duties, an applicant receiving anti-androgen therapy will require an operational check. (Also see Section 2.13, Medication – Drugs and Flying / Controlling.)
2.7.15 Renal Cell Carcinoma

Cerebral spread from a renal cell carcinoma is highly likely. Previously, this cancer has usually been detected late, and affected persons have had poor survival rates. However, recently these tumours have often been detected incidentally by ultrasound. 80% of these tumours are now <5cm in diameter when found, and five-year survival in those affected persons is >90% following treatment. Even for larger tumours (<10cm), five-year survival is >70% following treatment.

Aeromedical certification

As the outcome of renal cancer is unpredictable, and as cerebral metastases are common, CASA will determine aeromedical disposition of pilots and ATCs with this condition on a case-by-case basis. If granted, initial certification is likely to be ‘as-or-with co-pilot’ or ‘as-or-with second controller only’. Certification will not be granted until at least six months following completion of treatment. Unrestricted class 1 certification will not be considered until at least three years post treatment. Class 2 applicants will be considered for unrestricted certification after two years, and Class 3 applicants after one year. CASA requires follow up investigations as follows:

- Six-monthly CT scans for Class 1 applicants
- Annual CT scans for class 2 and 3 applicants.

In all cases, additional investigations must include Full Blood Examination (to exclude polycythaemia), Liver Function Tests, and Urea and Electrolyte estimations.

After 10 years without recurrence of tumour following treatment, an applicant may be deemed ‘cured’. Thereafter, no additional surveillance measures will be required.
2.7.16 Polycystic Kidneys

Polycystic kidneys (PCK) may be associated with several complications that could adversely affect the safety of air navigation. These include acute pyelonephritis, haemorrhage into cysts, renal stones, berry aneurysms and cardiac valvular disease. However, most persons with polycystic kidneys do not experience these complications. The commonest side effect of the condition is hypertension, usually readily controlled by medication. Due to the statistical association of polycystic kidneys with berry aneurysm, all applicants with known PCK must provide the result of a recent Magnetic Resonance Angiogram (performed within 12 months). If this is normal, CASA will usually approve medical certification. However, the test must be repeated and results provided to CASA at intervals of five years while medical certification is maintained. If the DAME detects any cardiac murmur when examining an applicant with PCK, CASA requires an echocardiogram and report for initial certification. This is also the case when any new murmur is noted.

2.7.17 Amyloid

This is a systemic disease with possible renal, neuropathic and cardiological manifestations. On diagnosis of the condition, inform CASA Aviation Medicine Section and advise the applicant not to exercise the privileges of his/her licence until investigations have been completed and results assessed as satisfactory by CASA. Following appropriate investigations, CASA will determine aeromedical disposition on a case-by-case basis.
### 2.8.1 Gynaecological and Obstetric Standard – CASR Part 67

The gynaecological and obstetric standards are found in the following paragraphs of CASR Part 67:

**CASR 67.150**  
For medical standard 1  
CASR 67.150(7)  
Table 67.150  
1.23 – 1.24

**CASR 67.155**  
For medical standard 2  
CASR 67.155(7)  
Table 67.155  
2.22 – 2.23

**CASR 67.160**  
For medical standard 3  
CASR 67.160(7)  
Table 67.160  
3.21 – 3.22

### 2.8.2 Severe Menstrual Disturbances

Applicants with a history of severe menstrual disturbances resistant to treatment must be assessed with caution. Such applicants are likely to be unacceptable for issue of a Class 1 or Class 3 Medical Certificate.

### 2.8.3 Pregnancy

Pregnancy, particularly during the final trimester, is a cause of temporary unfitness to exercise the privileges of all aviation licences. However, where the obstetrician or other medical practitioner supervising the pregnancy certifies that an applicant or medical certificate holder has no significant medical contraindications related to the pregnancy, she may be assessed as meeting the appropriate medical standard(s). The exercise of licence privileges in such circumstances may involve imposition of appropriate, individually determined operational restrictions.

The risk of acute incapacitation from premature labour exceeds 1% after 30 weeks gestation. Consequently, all medical certificate holders are advised not to exercise licence privileges after 30 weeks gestation.

Class 1 and 2 medical certificate holders are formally deemed medically unfit to exercise licence privileges from 30 weeks gestation until cleared by a post-partum assessment conducted in accordance with the last paragraph in this section.
Class 3 medical certificate holders may exercise relevant licence privileges until 34 weeks gestation provided that:

i. The obstetrician or other medical practitioner supervising the pregnancy certifies that the licence holder is fit for duties during this period; and

ii. Suitable administrative arrangements are made which ensure that sudden incapacitation of an affected licence holder due to premature labour will not adversely affect the safety of air navigation.

Thereafter, Class 3 medical certificate holders also are formally deemed medically unfit to exercise licence privileges until cleared by a post-partum assessment conducted in accordance with the following paragraph.

Following delivery, applicants are required to obtain a clearance from a DAME before once again exercising the privileges of an aviation licence. Depending on the stage of a pregnancy at which the event occurs, such clearance may also be required following a miscarriage, stillbirth or termination of pregnancy. Pregnancy is considered a medically significant condition and DAMEs should remind pregnant applicants of their obligations under CASRs to refrain from exercising their licence privileges until medically cleared. (See also 1.4.5 Temporary Incapacity of Certificate Holders.) Following a normal delivery, clearance to resume flying duties should be appropriate at six weeks post-partum.
2.9 Gastroenterology

2.9.1 Introduction

There is a very wide range of conditions of the gastrointestinal tract and associated organs that may have aviation safety implications. The greater majority are compatible with certification after appropriate assessment and management. This section provides guidance on common conditions of the gastrointestinal tract, liver and pancreas that may be presented to a DAME. It does not cover GI malignancy. All malignancy related advice is addressed in the Section 2.14 Malignancy of this handbook.

2.9.2 Alimentary System Standard – CASR Part 67

CASR 67 The alimentary system standards are found in the following paragraphs of CASR Part 67:

| CASR 67.150 | For medical standard 1 | CASR 67.150(7), Table 67.150 1.14 |
| CASR 67.155 | For medical standard 2 | CASR 67.155(7), Table 67.155 2.13 |
| CASR 67.160 | For medical standard 3 | CASR 67.160(7), Table 67.160 3.13 |

2.9.3 Gastro-Oesophageal Reflux Disease (GORD)

GORD is a very common condition. GORD and Irritable Bowel Syndrome are the two most common GI diagnoses in the Australian pilot population. Underlying pathology that is severe or progressive is unlikely. However, the possibility of cardiological cause of the symptoms should always be borne in mind, particularly where there is resistance to treatment. Where there is chest pain with uncertain aetiology, it is imperative to exclude a cardiac cause before moving to GI or other systems.

Around 50% of all patients diagnosed with GORD have no findings on endoscopy. This is often described as nervous or non-ulcer dyspepsia (NUD) but in reality this is endoscopy negative symptomatic gastro-oesophageal reflux that might be revealed by other techniques, such as oesophageal pH monitoring. NUD refers to symptoms that occur in a group of people without endoscopic or physiological evidence of an acid-peptic complaint. These people usually have a limited or zero response to acid suppressing medication.
Treatment can commence based on symptoms and endoscopy conducted, when response to treatment is poor, "alarm" symptoms occur (e.g., bleeding, dysphagia) or long term treatment appears to be indicated. Medication is generally very successful, especially with the development of Acid/Proton Pump Inhibitors (PPIs). These drugs have a low side effect profile. Bleeding from reflux oesophagitis while on PPIs is very rare. In theory, intense gastric acid suppression by PPIs may increase susceptibility to gastrointestinal infection, as the internal environment of the stomach is less hostile to ingested organisms. Those who have been treated and are symptom free are generally suitable for certification. Where there are persisting symptoms, treatment should continue, with regular reviews. High-risk 'alarm' symptoms such as dysphagia indicate endoscopy. After short term treatment symptoms may return, sometimes with a rebound effect after stopping a PPI. Ongoing treatment may be indicated. However, 'on demand' treatment is becoming more popular. This should not present difficulties with aviation duties.

Selective Serotonin Reuptake Inhibitors (SSRIs) are fairly commonly prescribed along with PPIs for non-ulcer dyspepsia. This is not a risk in itself, but caution is required with the use of SSRIs. Refer to the Section 2.6 Psychiatry in this handbook. Cisapride and SSRIs have a risk of cardiac arrhythmia. Treatment with cisapride is mostly limited to treatment of gastroparesis and therefore cisapride is likely to be withdrawn from the Australian market.

Other medications that may be used include H₂ receptor antagonists. There is some sedation associated with these medications, and a ground trial period is advised. Metaclopramide may on occasions alter the level of consciousness and should not be used for ongoing treatment.

**Barrett’s Oesophagus**

- **Long Segment**: Second-yearly endoscopy will generally be required.
- **Short Segment**: Five-yearly endoscopy will generally be required but current approaches vary.

### 2.9.4 Peptic Ulcer Disease

Management of peptic ulcer disease (PUD) has changed comprehensively following the identification of helicobacter pylori as the most common cause of ulcers. The vast majority of peptic ulcer disease is now known to be due to helicobacter or NSAIDs. Smoking is a further independent risk factor. PUD may be ‘silent’ and not cause symptoms but the risk of a sudden acute bleed in an asymptomatic person is small. "Silent" ulcers are more common and more likely to cause morbidity in those taking NSAIDs including COX-2 inhibitors.
Duodenal PUD

Symptomatic PUD with helicobacter pylori. With the onset of symptoms, the DAME should impose a period of no flying or controlling. In this case, there is a requirement to undertake clearance of the infection prior to return to flying. A negative urea breath test is usually taken to be definitive proof of clearance when performed around two months after treatment. Where the DAME is satisfied that that symptoms have resolved and there will be compliance with the rest of the treatment, there may be a return to flying or controlling. Such return must be on the understanding that evidence of clearance of infection is required within three months of completing treatment. Definitive proof of clearance is usually currently obtained by a urea breath test around two months after treatment. A period of at least seven days off PPIs is necessary prior to the test. Should the infection still be present, the risk of recurrence of symptoms is high (around 80% in the first year). Failed eradication usually indicates the need for further treatment. Without eradication after the follow up test, further treatment is required. Where this second attempt at clearance is unsuccessful, the pilot or controller will usually be grounded until eradication is proven. Where there is symptomatic duodenal PUD only without complication, there is no requirement for a second endoscopy to prove ulcer healing. Once eradication has occurred, the lifetime risk of recurrence is only around 3 to 5%.

Symptomatic PUD without helicobacter pylori. The cause of the PUD needs to be identified and corrected. This is most commonly NSAIDs. The usual treatment for the ulcer in this case is a PPI for around six to eight weeks.

Complicated duodenal PUD. Where there are complications of PUD such as bleeding or perforation the pilot should be grounded during treatment. Endoscopic proof of ulcer healing will usually be required prior to clearance to return to flying or controlling. Approximately 80% of all ulcers are healed after one month. Therefore, the second endoscopy is best scheduled for around this time. Furthermore, when helicobacter infection has been detected and treated, proof of clearance will be required either by a urea breath test or endoscopic gastric biopsies for rapid urea testing (eg CLO/HUT tests) or histology.

Chronic duodenal ulcer without eradication of Helicobacter pylori. Consideration will be given to certification of pilots or controllers who have not eradicated Helicobacter pylori, either due to not undertaking eradication or failure of the eradication. Applicants must be on long-term maintenance therapy with a proton pump inhibitor and without symptoms.

Gastric Ulcer

Gastric ulcers should be treated in a similar way to complicated duodenal ulcers. A second endoscopy, usually at one month after beginning treatment, is required to demonstrate healing of the ulcer prior to consideration of return to flying. The underlying cause of the ulceration needs to be identified and corrected wherever possible.
2.9.5 Hepatitis

**Acute**

Acute hepatitis may be due to a number of causes, predominantly infectious but may also be toxic or immunological. The individual is usually too sick to function adequately and is not physically able to fly. The enterically mediated causes, mainly Hepatitis A and E, and other causes such as CMV and EBV generally result in a full recovery. Initial work up should include routine blood tests, LFTs, FBE, infectious hepatitis serology, and an upper abdominal ultrasound. Return to flying is based on evidence of clinical recovery. Some episodes of hepatitis are followed by a prolonged phase when the patient remains jaundiced but otherwise recovers. No further investigation is recommended until six months after presentation, unless the episode is fulminant. In this case, patients may progress from walking to moribund in 24 to 48 hours, but thankfully this extremely fulminant presentation is rare.

**Chronic**

The main causes of chronic hepatitis of aeroomedical concern are Hepatitis B and Hepatitis C. These may be slowly progressive and may lead to cirrhosis and hepatic decompensation. There is unlikely to be an acute presentation, unless unexpected decompensation occurs secondary to portal hypertension causing haematemesis or ascites with infection.

Transmission of infection is not an issue in civilian aviation. The presence of Hepatitis D in particular should raise the prospect of intravenous drug use.

**Treatment for Hepatitis C.** Current treatment protocol for progressive Hepatitis C infection is combined Interferon and Ribavirin. Both of these medications have significant aeroomedical issues, with interferon occasionally causing neuropsychiatric symptoms, which may occur intermittently and unpredictably throughout treatment. Most people also experience significant malaise. Ribavirin produces a significant anaemia in many patients. Thus, there should be no flying or controlling during the course of treatment. There may be consideration of return to duties once off medication and any anaemia has resolved.

**Progressive hepatitis** There is no one measure of the progression of chronic hepatitis and cirrhosis. Bilirubin, albumin and prothrombin time/INR are the best independent laboratory measures. These should be considered together with the presence of ascites and encephalopathy. Each case needs to be individually assessed, particularly for the presence of portal hypertension and hepatic encephalopathy, including minimal (stage 1) hepatic encephalopathy (MHE). While there is no overt deterioration in cognitive or affective functioning, there will not be a restriction on flying, but increased surveillance will be necessary.

Abnormal LFTs that have been noted for greater than 12 months indicates the potential for chronic liver disease and cirrhosis.
Liver biopsy. A liver biopsy provides very useful diagnostic and prognostic information but can cause serious complications such as intra-abdominal haemorrhage. The decision to recommend biopsy will usually be delayed for at least six months after presentation depending on the degree to which liver enzymes and function are abnormal. Many patients with abnormal liver enzymes, even over a long period, will not have an absolute indication for liver biopsy. The timing of liver biopsy, if necessary, can be based on clinical progression and the level of concern expressed by the patient regarding diagnosis and prognosis.

2.9.6 Abnormal Liver Function Tests

Liver function tests are frequently found to be abnormal, with small elevations in one or two liver enzyme parameters. Given that the normal range by definition comprises two standard deviations from the mean, some 5% of all truly normal results will be classified as being abnormal—that is, falsely abnormal results. Where there is a real abnormality, the most common causes are Gilbert’s Syndrome (slightly raised unconjugated bilirubin, most common manifestation), non-alcoholic fatty liver disease (NAFLD), and minor alcohol effects.

In the absence of other clinical clues, slightly abnormal LFTs are best repeated after around one month. If they remain elevated, then the following is recommended:

1. Assessment of alcohol intake.
2. Family history of liver disease.
3. Blood Tests: Hepatitis B & C; Iron studies including ferritin; Copper studies; \(\alpha_1\) antitrypsin; hepatic autoantibodies.
4. Upper abdominal ultrasound.

Definitive diagnosis of a fatty liver can only be achieved by liver biopsy, but it is usually diagnosed based on clinical picture only. Alcoholic disease and diabetes mellitus should be included in the differential diagnosis. Ultrasound is moderately reliable for fatty liver, with increased echogenicity/altered hepatic texture most likely to be due to fat. However, fibrosis or cirrhosis could also be present and difficult to detect.

There should be regular reviews of aircrew with continuing abnormal LFTs. Where transaminase is <100, repeat testing should be every six to 12 months. If the transaminase is above 100, testing should be every three to six months.
2.9.7 Alcoholic Liver Disease

This section will not discuss alcohol related illness. Rather, there will be a discussion of the effects of alcohol on the GI system.

There are no definitive tests that can demonstrate clearly that alcohol is the cause of liver disease. In the end it comes down to honest reporting. Blood tests can help; MCV, $\gamma$GT and AST>ALT are suggestive. Liver biopsy is not definitive as many other causes can produce similar findings. Carbohydrate deficient transferrin is becoming used, but it remains largely a research tool. It can be useful as a confirmation, and to monitor progress within that individual.

Relapsing hepatic decompensation, gastritis, neurological signs, including cerebellar signs are all useful as part of a broader picture in advanced cases of alcoholic liver disease when cognitive and physical incapacity are present. DUI convictions may also be indicative.

Screening tests have not been found to be particularly valuable. The AUDIT is probably the most widely used. The tests are aimed at the severe end of the alcoholic spectrum. In practice, concern should be raised where the drinking exceeds the NH&MRC recommended limits of four standards drinks per day for men and two standard drinks per day for women.

Approximately 1:5 people who drink excessively will have liver abnormalities. It is the most reversible form of liver disease in the early stages. Stopping drinking will usually reverse abnormalities within around six months. The alcoholism is more important than the alcoholic liver disease, and the focus should be put on the alcoholism. Until there is a secondary effect from liver damage, there should be no impact on flying from the liver disease. The impact on flying will be from the alcoholism.

2.9.8 Gallstones And Gall Bladder Diseases

Asymptomatic gallstones (chance finding). It appears that the risk of cholecystitis in the presence of asymptomatic gallstones, where there has never been symptoms, is low, and almost certainly is below 1% per annum, although there is little data to work from. Gallstones ranging from a single large stone to multiple small stones may be detected by ultrasound. There is a slightly increased risk of biliary colic, pancreatitis and other hepatobiliary symptoms with small gallstones but the outcome of expectant versus prophylactic cholecystectomy is no different. There will generally be no change to flying status unless gallstones become symptomatic. In those who are asymptomatic there is no requirement to remove the gall bladder for fitness to fly.

Acute cholecystitis. Generally the pilot will be too sick to fly.
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**Following single episode of cholecystitis.** Often after a single episode, patients are treated expectantly and wait to see if another episode occurs. However, the risk of a further episode is around 5% per annum. Therefore, it would be expected that there is no return to flying until the gall bladder is removed. There may be the option of multi-crew certification for Class 1 or 2, or no solo controlling for Class 3 pending definitive resolution.

**Stones in bile duct.** The presence of stones in the bile duct is not compatible with flying or controlling. There is a significant risk of ascending cholangitis or pancreatitis, and the stones must thus be removed prior to returning to any duties.

2.9.9 Haemochromatosis

Haemochromatosis is a genetic disease that is often found incidentally, mainly through liver function testing or iron studies. The presence of the relevant genes in the Australian population is around 1:200. Around 50% of these will develop significant iron loading but not all genetically affected individuals develop liver or other organ injury (ie, phenotypic variation in disease expression). Organ injury depends on the severity of iron loading and co-factors such as significant alcohol consumption or other co-existent causes of liver injury. Should iron loading be prevented (usually by early detection and venesection treatment) then permanent liver injury (fibrosis/cirrhosis) usually does not occur. The best measure of iron stores in this context is serum ferritin.

Screening is possible, but to date has not been recommended in the Australian population. This may be by transferrin saturation, or by HFE genetic testing. There is no requirement to screen for haemochromatosis in the aviation context unless there is a family history of the disease.

Late diagnosis can be a problem, with progression to cirrhosis, pancreatic injury (diabetes mellitus), heart (arrhythmias, heart failure) and pituitary involvement. Males usually present in the 5th decade, females in the 6th decade due to their generally lower rate of iron load. If, at age 40 years the ferritin level is less than 1000 ugm/l and LFTs are normal, the risk of permanent liver damage is negligible. Cardiac assessment should include the presence of conduction defects and cardiomyopathy.

Treatment is via regular phlebotomies/venesection. Pilots and controllers should not exercise the privileges of their certificates for 24 hours after each venesection due to possible cardiovascular instability.
2.9.10 Pancreatitis

Pancreatitis is sometimes diagnosed in the setting of a small increase in serum lipase. However, for the diagnosis to be made there should be a significant increase in lipase together with acute abdominal pain.

The main risk factors are

- **Gall stones.** If gallstones are found, where there are no other risk factors, the gall bladder should be removed.

- **Alcohol.** This usually produces a relapsing picture.

- Hypercalcaemia.

- Hyperlipidaemia.

Where there is no obvious cause, there may be abnormalities in anatomy. Assessment is usually by MRCP first, followed by ERCP.

Risk of recurrent attacks is highly individual. Idiopathic pancreatitis may be expected to have one to two attacks per year.

**Single episode.** Following a single episode, where there are no ongoing symptoms and any predisposing factors have been addressed, the individual will usually be able to return to flying.

**Recurring pancreatitis.** While symptomatic the individual is very unwell, usually requiring narcotic analgesia. Recurrent pancreatitis is generally not compatible with continued flying or controlling.

**Chronic pancreatitis.** Generally the individual is too sick or has too much ongoing abdominal pain to contemplate flying. A CT scan can be performed to look for the presence of a pseudocyst or abscess. It is unlikely that anyone suffering from chronic pancreatitis will be fit for flying or controlling duties.

There is an association with the development of diabetes; a fasting blood sugar should be obtained as part of the workup.
2.9.11 Coeliac Disease

Coeliac disease can produce severe symptoms of bloating, diarrhoea, abdominal pain and anaemia, but mostly symptoms are mild and presentation is now usually in mid-life. Treatment with a gluten-free diet is usually effective, and should not be an aviation safety issue. People non-compliant with dietary modifications will continue to be symptomatic and some patients will exhibit refractory disease; these cases should be considered on their merits.

Coeliac disease should be thought of as a potential marker for other immunologically mediated diseases, such as type 1 diabetes mellitus and thyroid disease.

2.9.12 Irritable Bowel Syndrome

Irritable bowel syndrome is a very common diagnosis in the Australian pilot population. Some 20% of adult females and 10% of adult males have some symptoms consistent with this diagnosis. Most common symptoms are of abdominal pain, bloating, diarrhoea and constipation. It is unusual to get acute, severe symptoms.

There is a high co-morbidity with obsessive and depressive illness and SSRIs are often used.

Most people can be managed without drugs, using diet.

Diarrhoeal symptoms may be treated with loperamide. This drug does not usually have any central nervous system side effects. Diphenoxylate should not be the first drug of choice for aircrew or controllers, due to its potential neuropsychological effects. If it is necessary, this should be discussed with Aviation Medicine Section doctors.

Colicky abdominal pain and more general abdominal discomfort can be treated with anticholinergics such as donnatabs or mebeverine. Bloating will tend to persist despite treatment. Caution is required regarding anticholinergic side effects, particularly to vision.

Constipation can be treated with high fibre and simple laxatives, with osmotic laxatives such as magnesium sulphate or lactulose preferred in the longer term.

For refractory symptoms, tricyclic antidepressants are the most effective. Tricyclic antidepressants have significant potential aeromedically adverse effects. Refer to Section 2.6 Psychiatry for further guidance.

Most applicants will be fit to hold a certificate. Surveillance may be required annually in the more severe cases.
2.9.13 Inflammatory Bowel Disease

It is often assumed that Ulcerative Colitis and Crohn’s disease are versions of the same disease or are even interchangeable. However, they do have differing natural histories, with Crohn’s disease tending to be worse, with relapse being the rule.

It should be assumed from the outset that Inflammatory Bowel Disease (IBD) will impinge on certification. However, most sufferers are able to obtain certification with regular surveillance.

High-dose systemic steroids should not be used while flying due to the risk of neuropsychological side effects.

If the disease is unstable the person should be grounded, due to diarrhoea, pain and poor nutrition. Stabilisation is usually over several months during treatment with aminosalicylate drugs (eg, sulphasalazine, mesalazine, olsalazine) and either systemic or rectal corticosteroid treatment. Immunomodulatory medication (such as azathioprine or 6-mercaptopurine) is used to prevent disease relapse in more severe cases. There is a higher risk of skin cancer on azathioprine. Methotrexate can damage the liver.

Flare-ups tend to occur in a subacute manner, with warning often over several days. Acute incapacitation is unlikely, unless there is a clear pattern of such already established. Fitness to fly during flare-ups should be handled as a transient event with clearance to return to flight duties according to CASR 67.265.

Ulcerative Colitis

Ulcerative Colitis may be severe, but is often a relatively mild disease. This is especially so of treated ulcerative colitis of the rectum and sigmoid. The disease may ‘burn out’ in the 50s. With proctitis alone, risk of cancer is no different to the general population.

Crohn’s Disease

Almost all Crohn’s sufferers receive surgery at some stage. Systemic symptoms are more common with febrile disease and acute abdomen amongst the more common manifestations.

For mild disease, Full Blood Examination, C-reactive Protein, Liver function tests and rectosigmoid examination should be carried out annually. LFT should be more often if taking methotrexate.

When there has been pancolitis, regular annual or biennial colonoscopy will improve early detection of colorectal neoplasia beginning eight to ten years after initial diagnosis of colitis.
2.9.14 Chronic Diarrhoea

There are many potential causes of chronic diarrhoea. Most commonly there is irritable bowel syndrome. However, it is important to rule out an infective cause. Medications may also be a cause, such as weight loss treatments including xenical.

In general, diagnosis should be by exclusion of treatable GI disorders, and then treated as for IBS.

2.9.15 Diverticulitis

Diverticulosis of itself is not an issue for aviation safety. A single episode of diverticulitis is generally not of significant concern. Where there is chronic symptoms or recurrence, it is important to evaluate for risk of further symptoms. Partial colonic resection may be required. Each case will be considered on its merits.

2.9.16 Colonic Polypectomy

Following polypectomy by colonoscopy, there is an approximate risk of 1:300 to 1:500 that a significant colonic bleed from the polypectomy site will occur in the first two weeks. The risk is higher if anti-platelet drugs or anti-coagulants are taken after colonoscopy. During this time, therefore, it is best not to fly, due to the risk to safety and lack of access to care. However, it may be reasonable to consider flying operations other than single pilot operations or no solitary controlling.

2.9.17 Bowel Obstruction

Bowel obstruction will result in severe pain and vomiting. A history of bowel obstruction indicates a high risk of recurrence. A single band or hernia can be repaired and certification is usual after recovery. However, recurrent obstruction is of grave concern for certification. Generally, the more episodes of obstruction, the greater the risk of subsequent episodes. Certification will be on a case-by-case basis, with a surgical opinion as to the cause and likelihood of recurrence.
2.9.18 Stomas

In this section the underlying illness or event leading to creation of an “-ostomy” is not addressed. Stoma bags are generally vented and filtered to avoid any risk of trapping of gas or odours becoming an issue.

**Colostomy**

Generally, patients with a colostomy manage well. Most are due to surgery for colon cancer, and the oncology issues are more important. See section 2.14 Malignancy of this handbook. A total colectomy for functional problems often results in small bowel functional problems.

**Ileostomy**

The major issue with ileostomy is dehydration. Electrolyte disorders are fairly common, with hyponatraemia and bicarbonate loss. Fluid that is usually reabsorbed will be lost through the stoma, and an additional litre of fluid may be required.

The great majority of applicants with a stoma will not be restricted on the basis of the stoma.

2.9.19 Haemorrhoids

Haemorrhoids will occur with a relatively high frequency in the pilot population, due to poor low fibre diet, inadequate seating and dehydration. It is rarely a cause of acute incapacitation.

Rectal bleeding should be investigated to exclude other causes, especially carcinoma, even in the presence of haemorrhoids. Only with the exclusion of other causes should the haemorrhoids be regarded as the cause.

An acute clot in an external haemorrhoid often causes marked discomfort, but should not be sufficient to cause incapacitation.

The presence of haemorrhoids should not in general hold up certification.

2.9.20 Anal Fissure

As for haemorrhoids, the presence of bleeding should result in investigation to exclude other more serious causes. The fissure may be distracting but not to the extent of incapacitation.
2.9.21 Abdominal Hernias

Abdominal hernias are of concern due to the risk of acute intestinal obstruction. Where the hernia is amenable to repair and there is a risk of obstruction, it should be treated. If no treatment is planned, a justification based on likelihood of becoming symptomatic should accompany any application. While waiting for repair, the need to restrict the applicant will depend on clinical circumstances. Where there is a bowel loop in a hernia, restriction is likely.

Hiatus hernias only infrequently require repair. A rolling hiatus hernia is at greater risk of obstruction. Generally symptoms can be managed through the use of proton pump inhibitors or H<sub>2</sub> antagonists.

2.9.22 GI Bleeding of Unknown Cause

Where there is an iron deficiency anaemia that has been investigated, and endoscopy and colonoscopy are reported as normal, the source of bleeding is likely to be from the small bowel. Often iron deficiency occurs in those who have had long-term aspirin or NSAID treatment. At present, in the absence of ‘red flags’ (eg, systemic symptoms such as unexplained weight loss, fevers, night sweats, persistent significant change in bowel habit, abdominal pain or symptoms of overt GI bleeding such as malaena) to suggest a serious cause, the patient will not be further investigated, and iron supplements used. If supplements are successful, then a cause will probably never be found.

Where iron supplements are used and anaemia progresses, further investigation is required; this may be enteroscopy using a similar procedure to endoscopy, ‘capsule endoscopy’ and/or CT scan. A thorough work up is mandatory to exclude significant disease.

It should not be necessary to ground pilots except those whose anaemia progresses and haemoglobin drops below 10.

If the Hb recovers, then surveillance should be of regular Hb levels, at least every two months for 6-monthly and subsequent testing depending on progress. Restoration of body iron stores (as documented by a progressively normalising serum ferritin taken during a period when iron supplements have been stopped for at least one week) by treatment with oral iron supplements usually takes three to six months minimum, usually with the Hb having returned to normal at an earlier time.

A presentation of malaena is a very different proposition. A cause will need to be identified as there is a high risk of recurrence and of severe causes. The individual should not fly until the cause has been identified and risk of recurrence quantified.
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2.10.1 Introduction

Applicants with haematological conditions are considered individually depending on the nature of the condition, its cause (if known) and natural history. The overriding concern is that the blood must carry sufficient oxygen to satisfy metabolic requirements during all phases of flight.

2.10.2 Reticulo-endothelial System Standard – CASR Part 067

CASR 67 indicates that the Reticulo-endothelial System standards are found in the following paragraphs of CASR Part 67:

- CASR 67.150 For medical standard 1
  - CASR 67.150(7)
  - Table 67.150
  - 1.17 – 1.18

- CASR 67.155 For medical standard 2
  - CASR 67.155(7)
  - Table 67.155
  - 2.16 – 2.17

- CASR 67.160 For medical standard 3
  - CASR 67.160(7)
  - Table 67.160
  - 3.16

2.10.3 Anaemia

Applicants whose haemoglobin is less than 100 g/l should be investigated as clinically indicated. Final assessment depends on the results of haematological investigations and response to treatment. Full reports are required.

2.10.4 Polycythaemia

Applicants with higher than normal haemoglobin must be appropriately investigated. In secondary polycythaemia due to lung disease, the lung disease is more important. Applicants with polycythaemia vera, untreated or uncontrolled, will be assessed as failing to meet the standard, but will be reconsidered depending on their response to treatment, and on specialists' reports.
2.10.5 **Acute Leukaemia**

Acute leukaemia of any type is disqualifying. Applicants assessed as in remission may be permitted to exercise the privileges of the licence held, depending on specialists’ reports. Full details are required.

2.10.6 **Chronic Leukaemia**

Chronic leukaemias are assessed individually. A specialist’s report is required in every case, including a statement on prognosis for the next year (re-certification is year by year, if at all). Some chronic leukaemias, e.g. CGL, CLL and other myeloproliferative diseases, are usually associated with an enlarged spleen. There is a consequent risk of splenic infarction and rupture (spontaneous or traumatic) in these applicants.

2.10.7 **Lymphomas**

Applicants with lymphoma are assessed individually. A lymphoma in remission, especially Hodgkin's Disease, is usually consistent with a pass assessment for applicants concerned. Annual specialist reports are required in all cases.

2.10.8 **Haemoglobinopathy**

Applicants with abnormal haemoglobins (HbS) are assessed individually. Full reports to Aviation Medicine Section are required.

2.10.9 **Haemophilia**

Applicants may be certified at the Class 2 level if the condition is stable. Full reports from the treating physician are required.
2.10.10 Oncology

Assessment of applicants with any diagnosis of malignancy is based upon the following considerations:

- Nature of tumour
- Stage of development/invasion
- Response to therapy
- Likelihood of recurrence in a form likely to be incapacitating, e.g. cerebral metastasis.

In general, applicants who are no longer receiving chemotherapy or radiotherapy, in whom the risk of incapacitation is considered to be low during the period of currency of the Medical Certificate, are given a pass assessment subject to continued medical surveillance.

Also see Section 2.14 Malignancy.

2.10.11 HIV Disease

Applicants who are HIV positive but without clinical disease may be certified at the Class 2 level and receive restricted certification (as or with co-pilot) at the Class 1 level.

Applicants should obtain reports (including CD4 helper cell count) from their treating physicians prior to seeking renewal.

When an applicant develops clinical illness associated with HIV disease, further certification is determined on a case-by-case basis. Full clinical details are required.

2.10.12 Blood Donation

In healthy individuals, the fluid depletion that accompanies donation of one unit of blood is replaced within several hours. Any effects from the loss of haemoglobin should not be significant for normal flying operations.

Active pilots should be discouraged from flying until 24 hours have elapsed following blood donation.
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2.11.1 Applicable Regulations

CASR 67 With regard to the Skeletal System the CASR Part 67 states as follows:

CASR Part 67, **Table 67.150** criteria for medical standard 1 states:

1.25 Is not suffering from safety-relevant active disease of the bones, joints, muscles or tendons
1.26 Is not suffering from safety-relevant functional sequelae of medically significant conditions of the bones, joints, muscles or tendons

CASR Part 67, **Table 67.155** criteria for medical standard 2 states:

2.24 Is not suffering from safety-relevant active disease of the bones, joints, muscles or tendons
2.25 Is not suffering from safety-relevant functional sequelae of medically significant conditions of the bones, joints, muscles or tendons

CASR Part 67, **Table 67.160** criteria for medical standard 3 states:

3.23 Is not suffering from safety-relevant active disease of the bones, joints, muscles or tendons
3.24 Is not suffering from safety-relevant functional sequelae of medically significant conditions of the bones, joints, muscles or tendons

2.11.2 Pain Management

Pain is a complex issue. Severity of reported pain is poorly correlated with the severity of the underlying condition. It is thus very important to identify the underlying condition and prescribe pain relief accordingly. The following discussion should be considered in conjunction with Chapter 13 of this handbook, dealing with certification issues and medication. Each drug group has an annotation, which places it in the category (A-E) as described Chapter 13.

**Non-steroidal Anti-inflammatory Drugs (NSAIDs) (B)**

In general, these medications (NSAIDs) are suitable for aviation duties, but with surveillance of possible adverse effects, particularly of gastric origin. The underlying condition for which they are prescribed needs to be considered in each case.
Cyclo-oxygenase type 2 (COX-2) inhibitors have been found to have an association with coronary disease and strokes in those already predisposed, through an effect on platelet function. It is generally advisable to cease COX-2 inhibitors unless the applicant has a history of peptic ulcer disease. Celebrex continues to be available and Mobic is now usurping the past popularity of Vioxx.

The older non-steroidal anti-inflammatory drugs, such as Ibuprofen, Feldene and voltaren continue to have a place.

Aspirin is effective as an anti-inflammatory agent, but has a significant risk of GI bleeding.

**Paracetamol (A)**

A maximum of four grams a day applies in the case of an adult, due to liver toxicity. It is not an anti-inflammatory agent, functioning in the main, directly on the brain to modify pain response in orthopaedic and rheumatological applications. Where the pain is purely mechanical, rather than inflammatory, Panadol may be the better option.

**Disease Modifying Anti-Arthritic Drugs (DMARDs)**

DMARDs have an important role in reducing symptoms from the condition for which they are prescribed. Where the pilot is being managed closely to identify any adverse effect early, and where there has been an adequate trial period—usually 4 weeks after commencing the medication —prior to return to flying or controlling, continued certification is usual. The extent of the functional effect from the underlying condition will be of significance in determining fitness for continued certification.

**Salazopyrin (C)**. There are often side effects such as indigestion and hepatotoxic reactions, which largely occur in the first three months. Therefore, the individual should be closely monitored during this initial period of medication.

**Gold (C)**. This is out of favour at present. It is toxic to bone marrow and can cause nephrotic syndrome.

**Methotrexate (B)**. Toxic effects are revealed early. Full blood count and liver function testing is suggested every six to eight weeks.

**D-Penicillamine (C)**. There is a range of side effects such as scleroderma, nephrotic syndrome, myasthenia gravis and marrow toxicity. If an individual is on this treatment without side effects for more than six months, it is likely that they will remain without side effects.

**Luflunamide (C)**. In the early period there may be diarrhoea and skin rash. FBE, ESR and LFTs are needed regularly.
Cyclosporin, cyclophosphamide (C). Provides serious immune suppression, but with a high risk of side effects. Generally these are only used when the underlying disease is severe and would normally preclude certification anyway.

Biologic Agents, such as ana kina and anti-tumour necrosis factor preparations (B). Side effects do not appear to be severe. The high cost at present tends to limit their use to severe disease.

Narcotics (C)

It should be considered barring treatment using all forms of narcotics for individuals involved in aviation-related duties. In exceptional circumstances, consideration may be given to individuals requiring narcotic analgesia where:

- The condition itself poses no safety risk
- Narcotics have been used for an extended period and it is clear that there is no adverse effect on attention or cognition
- Neuropsychological testing demonstrates that there is no demonstrable decrement in performance
- ATC simulator testing and pilot in-flight testing indicates satisfactory performance
- There is no requirement to use the medication within 12 hours of commencing aviation activities
- There is no evidence of addiction to the analgesic.

Tramadol is gaining considerable popularity. While not an opioid, it does have narcotic effects and may be addictive. It has inconsistent effects and side effects, with neuropsychological side effects and causing serotonin syndrome. Panadeine Forte contains 30mg codeine and is a significant opioid dosage.

Those applicants taking narcotics are, in general, ones who self-select; that is, those experiencing significant side effects from the medication, or with significant problems from the underlying condition. They should not plan to fly. They may feel suitable for duty, but there may well be subtle impairments and self-delusion (ie overconfidence) that the pilot or controller may not identify.

Amitriptyline (C)

This is often prescribed in low doses of 25 to 50mg at night to augment sleep. It is a soporific and has a long half-life. Some people are highly sensitive and there are a number of cross-reactions. Many people will be 'slow to take off' after taking amitriptyline the night before.
Corticosteroids (B)

Corticosteroids are a mainstay of treatment in many rheumatological conditions. They can be administered dermally, orally, by eye drops, intra-articularly, injection into the affected soft tissue and intravenously. Local application, even by intra-articular injection, is generally safe. Systemic symptoms are rare. However, occasional sleeplessness and hypomania is observed. There should be no flying or controlling within 24 hours following a corticosteroid injection.

Oral corticosteroids have a large and diverse range of adverse effects. These include mood change, thinning skin, diabetes mellitus, immune suppression and osteoporosis. These are almost invariably time and dose related. A general cut-off for onset of side effects is greater than 10mg per day for more than six months. If more than 10mg per day is being prescribed, bone density assessment should be obtained every two years.

If taking oral medications such as dexamethasone or betamethasone, there should be a more intensive monitoring program, as there is a high incidence of side effects. It is important to understand why the individual has been placed on these medications rather than prednisone or prednisolone.

2.11.3 Functional Assessment

Range of movement

Neck range of movement (ROM) is the most important assessment for a DAME. Unless the restriction is severe, 'trick' movements are usually available to compensate for limited neck movement. Provided the pilot can evacuate himself and his passengers safely and rapidly, there is generally no impediment strictly due to ROM limitation.

In reporting to CASA, the ROM should be given in degrees in the three planes of movement, flexion/extension, lateral flexion and rotation.

Operational Assessment

A specific flight test to evaluate the functional impact of a restriction of movement due to an orthopaedic or rheumatological condition may be required. Each assessment will depend on the pilot, the aircraft type and the normal aviation activity undertaken.

A DAME may recommend directly to the certificate holder/applicant that such an assessment take place, or a recommendation can be forwarded to CASA for aviation medicine section to consider such an assessment. Where the DAME conducts the assessment from a referral, permission should be sought from the pilot for details of the impairment to be included in the referral letter. The letter to the pilot undertaking the assessment should be written in plain English, requesting advice of the functional effects on the certificate holder's ability to carry out aviation duties. These may include cross control in strong crosswinds, or single engine flight in a twin-engine aircraft, the full and free movement of all flight controls, and ability to see unimpeded in all significant areas.
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It is often beneficial to talk to the assessing pilot prior to the assessment to clarify the requirements. A Chief Flying Instructor of a registered flying school can perform the assessment, provided that the individual is prepared to conduct such an assessment. Tests directed to be undertaken by CASA aviation medicine section will usually be performed by an approved testing officer (ATO).

Should the pilot refuse permission for release of relevant medical information, there may be a limited capacity to properly assess the individual, and further testing may be required. The pilot should be made aware of the consequences of the refusal and an attempt made to reach agreement on what information can be imparted.

After commencing narcotic or opioid medication, the ATC or pilot should have a test equivalent to their regular test/training regime. For instance, a private pilot will need to bring forward a biannual flight test, and provide a report of that test as part of the assessment for certification.

2.11.4 Specific Conditions

Arthritis

Rheumatoid arthritis (RA)

RA often has systemic effects. It tends to be erosive, with the destruction of tissue. Joint deformity in the hand and grip weakness is likely to be the most significant issue for aviation. A normochromic normocytic anaemia of chronic disease is common and needs to be monitored. Sufferers can have a fairly normal life, particularly if the activity of the disease is controlled early. As a generalisation, people with Rheumatoid arthritis tend to function at a higher level than the extent and apparent severity of the disease would indicate. Fitness for aviation duties will be assessed on a case-by-case basis.

There may be ophthalmic effects, such as from the use of Plaquenil or steroids. If there are no signs or symptoms of ophthalmic involvement, there is no requirement for routine ophthalmic assessment beyond those stipulated based on age and Class of certificate.

RA should best be monitored for effective management by a rheumatologist rather than GP. An annual report from the specialist will usually be required as part of ongoing certification. Serial plain X-rays, FBE and ESR can follow disease progression and activity. LFTs are usually required to check for side effects of medication.
Osteoarthritis (OA)

There may be primary osteoarthritis, without previous trauma to the joint, or secondary osteoarthritis where there is a predisposing injury. There is usually no inflammation, but Heberden’s and Bouchards nodes in the hand do have an inflammatory component. The effects can be divided into functional limitations as a result of reduced range of movement and pain. Simple analgesics and physiotherapy are the mainstay of treatment. Unless there is a significant functional impact, sufferers from osteoarthritis will generally have unrestricted certification. Serial plain X-rays and testing for side effects of medication will be required, again on a case-by-case basis.

Seronegative polyarthritides

This may be rheumatoid arthritis where there is no rheumatoid factor detectable, or those associated with HLA B27. 8% of the Caucasian population are positive for HLA B27, and some 1% to 8% of these develop a seronegative polyarthritis. The most prominent type is Ankylosing Spondylitis (AS), but there is also Reiters syndrome, post-salmonella and post-yersinia infection and psoriatic arthritis.

Ankylosing spondylitis presents as a progressive stiffening of the lower back, with pronounced symptoms after extended inactivity, such as sleep. Physiotherapy modalities, exercise and NSAIDs are the most widely used treatment. It affects males to females in the ratio of 8:1. Sitting for a long time, such as in ultra-long haul sectors, may induce stiffness, but it is generally possible to regularly stand and perform stretches.

Gout

Gout tends to be poorly treated overall. It can be of sudden onset and disabling. There is increased risk from sitting, when dehydrated and post-surgical. Thus, the aviation environment does have significant risk for a gout attack.

Most attacks are in people who are poorly managed and who are not compliant with medication and diet.

More than three attacks a year, particularly where the serum urate is greater than 0.45, and tophaceous gout, where there is the presence of destructive articular disease demonstrating long-standing poor control, carries unacceptable risk of a further attack. Given that the onset can be sudden, within the length of a flight, and can be incapacitating, careful consideration will be given to making the pilot or controller unfit until adequate control is demonstrated. Control would be shown through uric acid levels, compliance with medication such as allopurinol, and avoidance of alcohol and other dietary modifications.
Psoriatic arthritis

This usually presents as mono or oligo arthritis, and affects around 8% of patients with psoriasis. It can be progressive and present similarly to rheumatoid arthritis. It should be considered on a case-by-case basis.

Lupus and Connective Tissue Disorders

There appears to be a reduction in numbers and severity of these conditions in the last 50 years. Systemic Lupus Erythematosus (SLE) is diagnosed mainly through a positive anti-nuclear factor and elevated anti DNA, but requires at least four criteria. DMARDs hydroxychloroquine and steroids are the mainstay of treatment. Multiple organs may be involved, including reticulo-endothelial with anaemia, and kidneys with proteinuria. When stable, SLE should be reviewed by a rheumatologist three-monthly, with certification usually being limited to 12 months. Annual reports will need to address any systemic involvement.

Polymyalgia Rheumatica

This generally presents as an acute illness, with equal sex ratio, and rarely under age 60. There is central joint involvement and night stiffness. It is usually well controlled with corticosteroids, of around 15mg of prednisolone per day. Once on treatment, there is a return to normal function within one month, and a gradual reduction in medication with cessation of medication over a period of around two years.

The condition can be relapsing, with the most serious effects being cranial arteritis, which may result in severe headaches and blindness. Visual loss can be sudden. This is rare once on steroids, and if ESR/CRP results are normal, risk is acceptably small.

All certificate holders should be monitored through three-monthly ophthalmology and rheumatology reviews, and three-monthly ESR tests. Certification is usual, provided the condition is controlled, with six- or 12-monthly validity. The relevant reports will be required for re-certification.

Osteoporosis

This condition is associated with a number of risk factors. These are:

- Chronic ill health
- Cigarette smoking
- Family history
- Systemic steroid use
- Post menopausal women
- Women with non-functioning ovaries.
It is less common in males, but still substantial, especially where testosterone levels drop.

In those with established osteoporosis, bone density estimation should be obtained three-yearly. In the presence of a fracture, bisphosphonates such as fosamax and actonel can assist. Weight-bearing exercise is important for prevention and treatment.

There is little immediate relevance in civilian flying if a fracture does not exist or has not occurred. Any fracture should be treated on its own merits.

**Chronic Fatigue Syndrome (CFS) and Fibromyalgia**

This is a diagnosis of exclusion as there is no specific diagnostic test. No pathology has ever been demonstrated to be the cause. It is widely assumed that a psychological disturbance underlies the presentation in most if not all sufferers. Symptoms are diverse, including sleep disturbance, trigger points, and depression. While fatigue is prominent, there is no change in oxygen consumption with exercise; the only detectible change is in terms of perceived effort. Treatment is prolonged and expectant, with anti-depressants widely prescribed. Rest should not be prescribed.

Most CFS patients are not motivated to continue flying while symptomatic. A psychiatric diagnosis should be excluded. While symptomatic, chronic fatigue syndrome is generally incompatible with aviation duties.

**Scleroderma**

In its severest form—progressive systemic sclerosis—this condition can have implications on flying. It is generally found in a population in their third and fourth decades and is more common in females. It can progress rapidly, and involve the hand, resulting in contractures, with marked functional limitation. It can be made worse in cold environments such as often encountered in cockpits with poor environmental control. The CREST syndrome (calcinosis, Raynaud’s, oesophageal involvement, sclerodactyly and telangiectasia) often involves pulmonary function, with 15% having pulmonary hypertension. It is important to maintain close supervision through rheumatology follow-up at least annually. Refined pulmonary function testing, CT of lungs and echocardiography will be needed where there is any suspicion of pulmonary involvement.

**Vasculitis**

Polyarteritis nodosum is the most common form. Vasculature anywhere in the body can be involved, and commonly includes the kidneys. Prognosis is always guarded, and certification will be based on history of extent and severity of disease and effectiveness of medication.
Spinal Injury

Whiplash

This condition is something of an enigma, as it tends to be described in only very limited contexts, particularly rear-end motor vehicle accidents. Pathology cannot be demonstrated experimentally. A lateral X-ray should be obtained acutely to exclude instability. A bone scan may be valuable at three weeks to identify bone or connective tissue damage.

Most cases settle very quickly. The principle method of rehabilitation is one of goal setting with steady improvement over several weeks.

Certification should be based on mobility and pain impact. Most cases can be managed by the DAME determining when the certificate holder is fit to return to aviation duties.

Stable fracture of the spine

There should be an expectation of a return to activities within 12 weeks, with an absolute maximum of 26 weeks. The ability to withstand prolonged sitting will be the main decider.

Non-stable fracture of the spine

Where there is operative treatment with insertion of a plate, recovery will be in 12 to 26 weeks. With two fracture levels, there is a longer recovery time, but practically all return to full activity.

Posterior ligament rupture

This is potentially unstable, where two of the three columns in the spine are damaged. Return is based on the treating orthopod advice, but usually should be three months before returning to flying activities.

Spinal fracture with cord lesion

Nearly all such patients will have fixation with pedicle screws. Recovery is usually based on force of injury. It will be necessary to wait for the assessed maximal recovery, and see how the individual is able to function. Urinary tract obstruction is often the main problem. Modifications to the cockpit, such as a Blackwood Pole for pedal manipulation can potentially still permit some flying.

Paraplegia

Once stable and functioning satisfactorily utilising a range of mechanical aids, should the individual wish to undertake aviation activities, functional testing will be required. The main issues will be mobility around the cabin, particularly full and free manipulation of flight controls and emergency egress.
2. Medical Aspects

2.11 Orthopaedics and Rheumatology

Spinal Stenosis

The diameter of the cord is 11 mm minimum. Where the diameter is less than this, symptoms may occur. Pathology is often found in the lumbar region. There may, however, be smaller sizes found in scans, which have no symptoms. Where the neck is involved, there will usually be a myelopathy. The condition is usually slowly progressive, with nerve root pressure and neurologic claudication. Sitting does not affect the condition significantly, and the result is that pilots are affected very little.

Syringomyelia

This condition is more common in males, and is mostly an incidental finding. Symptoms, when present, tend to be vague, with difficulty in fine motor control in the hands. There is an asymmetric abdominal reflex. An MRI will show Arnold-Chiari malformation or a syrinx. Where there are symptoms, there is usually drainage of the syrinx, and reassessment. Most will be able to continue flying unrestricted.

Scheuermann's Disease

This abnormality of bony development is predominantly found in the lower thoracic vertebrae in males. Longitudinal studies have indicated that it has minimal impact in the long-term, and should not affect flying. Occasionally there is significant scoliosis, which requires a brace for about six months.

Spondylosis

This is an injury to the pars interarticularis. It is not congenital, but is found in 5% of boys by the age of five years. This varies by family history and racial background, and is more common in males. It can occur as a result of overuse in gymnasts and fast bowlers in particular. Rest and attention to technique is the core of treatment.

Spondylolisthesis involves a bilateral lesion with slippage of one vertebral body on the one below. When the slip is at risk of compromising the cord, or there is disability, surgery may be required. There may be some pain or discomfort but generally this does not preclude work.

There is little to suggest that there are any issues for aviation.

Scoliosis

When scoliosis is less than 30° it is of little consequence. Once at 50-60° at the end of its growth, it is often progressive and requires surgical intervention. There is little impact on function or on flying.
Backache

Backache, usually lumbar, is very common. Early normalisation of activities is the cornerstone of treatment. Avoidance of twisting is helpful. The few that are not cured within six to 12 weeks should be assessed in a rehabilitation program to seek an underlying problem.

In rotary wing aircraft, the normal posture of forward bending and lateral flexion tends to induce backache. No degeneration is reported from repeated minor stressors. It is usual not to complain of such pain until after retirement from aviation.

Sciatica

This is leg pain as a result of pressure on nerve roots. Back pain may also be present, but the leg pain is usually much more prominent. Treatment is expectant, with 50% improvement in 12 weeks, 80% in two years and 95% in five years, while surgery (laminecetomy) has a 95% success rate. Recurrence is around 1-2% per annum.

It is possible to be fully active with sciatica without the risk of further damage. Thus, return to flying should be based on symptoms and need for medication.

Loss of Limb

Amputation should be considered on the basis of function. Occasionally, phantom pain or a neuroma in the stump can cause discomfort, but this is rare and can be adequately managed. Should the loss of limb be due to a tumour, the risk of recurrence must be taken into consideration.

Above-knee amputation as opposed to below-knee amputation will have a major impact on functionality. The pilot must be able to demonstrate the ability to fully operate the rudders, or modify the aircraft accordingly. A double above-knee amputee is unlikely to be able to fly an unmodified aircraft due to the inability to generate sufficient force to operate the rudders.

Upper limb prostheses that are most functional are not necessarily the most 'natural' in appearance, often being hooks. The loss of digits makes fine manipulation difficult.

Shoulder Injury

Rotator cuff injury. Most commonly, this is due to supraspinatus tear, and recovery is good. Physiotherapy, with up to three steroid injections can be helpful. Arthroscopic inspection can be useful to identify the pathology more accurately. Ultrasound is not helpful unless the sonographer is very experienced. Time to recover can be from 6 weeks to two years. Once able to move the affected arm through an arc in the functional area, the individual can be returned to flying. Surgical repair is sometimes necessary in the young patient.
Shoulder instability. Three episodes of subluxation or dislocation in a single direction should lead to surgical repair. Where there is multidirectional instability with ligamentous laxity, surgical repair is unhelpful, and effort should be directed to conservative treatment of maximal rehabilitation effort. Strength and balance of muscles is needed to overcome the ligamentous injury.

Frozen shoulder. Early treatment of frozen shoulder with local and oral corticosteroids has been reported as beneficial. In chronic, established cases the orthopaedic aim is to break down adhesions limiting the range of movement and causing pain. Early intervention with manipulation under anaesthesia and steroid injections usually results in recovery. Once again, ability to move in the functional arc for flying is needed before return to flying should be considered.

Lateral Epicondylitis

This condition may be encountered in a number of circumstances, usually involving repetitive activities. The core of the treatment is physical therapy with graduated exercises to increase strength and endurance, remediation of the causative activity, and steroid injections into the affected tendon complex are beneficial. Resumption of activity too soon often results in recurrence. Each case should be considered in its merits, based on forearm strength and exacerbating actions.

Carpal Tunnel Syndrome

Typical CTS symptoms involving the median nerve distribution at the wrist, will often respond to conservative treatment modifying activities combined with steroid injection. Surgery is usually curative. With arthroscopic surgery in experienced hands, the individual can return to work within four weeks, while open surgery recovery requires somewhat longer. Return to flying will be based on an assessment of strength and endurance of the wrist.

Upper Limb Fractures

The presence of a plaster is a difficult situation to assess. It is best to not attempt to fly while there is an upper limb plaster in place. A better option from the aviation perspective is usually a pin, possibly with a small splint, which will permit continued activity.

Each case needs to be based on functional capability, which should be assessed by the DAME. If there is a desire to fly while there is a plaster in place, or there is doubt about functional capacity, then a functional test, carried out by a CFI or ATO would be appropriate.
Lower Limb Fractures

Lower limb fractures often take 6 months to heal adequately for normal function. However, many fractures are pinned, or can have an inflatable plaster that is only inflated when putting stress through the bone. Thus, most lower limb fractures will be compatible with continued flying. The DAME should assess likely functional limitations of aviation relevance.

Knee Derangement

Following an anterior cruciate ligament rupture, there will be a period where the pilot is unfit for flying. Without surgery, this is likely to be around six weeks. With surgery, the expectation would be around three months. Medial collateral ligament tear will have little impact on flying.

Arthrodesis

Following an arthrodesis, activity is generally near normal. For flying, a hip arthrodesis will be nearly impossible due to the limitation of mobility. Knee arthrodesis is difficult and will require in-flight assessment, while ankle arthrodesis should not produce significant difficulties.
2.12.1 Ear, Nose and Throat Standard – CASR Part 67

The ear, nose and throat standards are found in the following paragraphs of CASR Part 67:

**CASR 67.150**
For medical standard 1
CASR 67.150(7)
Table 67.150
1.27 – 1.28

**CASR 67.155**
For medical standard 2
CASR 67.155(7)
Table 67.155
2.26 – 2.27

**CASR 67.160**
For medical standard 3
CASR 67.160(7)
Table 67.160
3.25 – 3.26

2.12.2 Hearing Requirements Standard – CASR Part 67

The hearing requirements standards are found in the following paragraphs of CASR Part 67:

**CASR 67.150**
For medical standard 1
CASR 67.150(7)
Table 67.150
1.29 – 1.30

**CASR 67.155**
For medical standard 2
CASR 67.155(7)
Table 67.155
2.28 – 2.30

**CASR 67.160**
For medical standard 3
CASR 67.160(7)
Table 67.160
3.27 – 3.28

2.12.3 Examination of the Ear

There should be no signs of active disease of the middle ear cavity. Applicants should be able to ventilate the middle ear.

Perforations of the tympanic membrane are acceptable, however the cause of the condition should be sought and investigations initiated, if appropriate.
2.12.4 Hearing

An applicant for a Class 2 Certificate must be able to hear an average conversational voice at two metres with the back to the examiner. Accordingly, applicants who are deaf in one ear may pass.

More rigid standards apply to professional licence holders. Audiograms are required for initial Class 1 and 3 and at defined intervals thereafter.

If any doubt arises as to the acceptability of an applicant's hearing, an audiogram should be obtained and, if appropriate, specialist consultation recommended. The audiogram printout should be enclosed with the medical report for initial issue Class 1 and 3 examinations.

Audiograms are acceptable from any qualified audiologist. Where the deficit is long-standing and has been previously recorded, an audiogram should be provided to demonstrate that there has been no significant deterioration.

If a supplementary speech test is required, this should only be performed by an audiologist provided calibrated tapes and other required equipment are available.

If the applicant fails the speech-based hearing test, in some cases an in-flight test may be offered if he/she has a high level of aeronautical experience. Such an operational check will involve evaluation of relevant aspects of the applicant's hearing by a CASA Flying Operations Inspector or an Authorised Testing Officer with test material transmitted from a control tower. Ideally the test should be conducted in the class of aircraft, which is the same as that which the applicant normally operates or intends to operate.

Applicants for Class 2 Certificates may wear hearing aids during testing. Any applicant who meets the hearing standard in this way is required to wear the aid during all communications on the ground that relate to the conduct of a flight. Adequate amplification during flight may be achieved by the use of headphones. Headphones with ear cups have the added advantage of blocking out aircraft noise. All pilots should be encouraged to fly with headphones, in the interests of improving hearing and for hearing conservation.

2.12.5 Vestibular Function

Any history of vertigo or dizziness should be fully investigated and the presence of nystagmus noted. If there is concern about vestibular function, referral for caloric testing and electronystagmography should be considered.
2.12.6 Speech

Any significant speech impediment or stuttering should be reported, and full details are required. As a minimum, reports from an ENT specialist and from a speech pathologist should be obtained and forwarded to Aviation Medicine Section, together with the DAME’s own assessment of the condition and its likely effects on the safety of air navigation.

2.12.7 Sinuses

Applicants with acute sinusitis are "temporarily unfit" for aviation duties. Chronic sinusitis is unacceptable until appropriately referred, treated and improved.
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2.13.1 Introduction

The increasing use of drugs, both prescribed and self-administered, within the Australian community, presents a significant challenge to DAMEs when determining an applicant’s fitness for aviation related duties. All drugs, even those purchased “over the counter (OTC)”, may have adverse effects that may render aircrew members or air traffic controllers unsafe to fly or to perform their normal duties.

General Principles

As a general principle, DAMEs should assume all medications are hazardous for aviation operations until demonstrated otherwise.

When assessing whether a pilot or Air Traffic Controller (ATC) taking medication is fit for aviation-related duties, two principal issues should be considered:

- The potential for the underlying medical condition to affect fitness for flying or controlling duty
- The potential for the treatment (including drug therapy) to reduce fitness for flying or controlling duty.

The following characteristics of specific compounds will influence the limitations on their safe use in the aviation environment:

- Unwanted, dose-related drug effects (e.g. blurred vision or drowsiness)
- Hypersensitivity/allergic reactions
- Idiosyncratic effects
- Drug side effects that may occur in some of the population (e.g. nausea, liver damage or bone marrow suppression)
- Drug combination effects – potentiation
- Drug interactions; particularly with alcohol, to increase risk of side effects or reduce activity of the drug/s.
Virtually all drugs unacceptable for aviation duties, regardless of the nature of the disorder being treated, have one or more of the following effects:

- CNS depression
- CNS stimulation
- Autonomic nervous system disturbance
- Disturbance of equilibrium.

**Determination of Fitness for Aviation Duty when Taking Medications**

It is not practicable in this chapter to indicate whether a specific drug or even class of drug is always compatible with safe flying or controlling. Rather, this chapter provides a general overview of many commonly used medications and their use in the flying environment. Whenever a DAME is in doubt about a pilot or controller who is taking a drug or medication, advice should be obtained from the CASA Aviation Medicine Section.

With regard to their effect on fitness for aviation duties, medications may be divided into five groups:

A. Those medications considered safe when flying or controlling.

B. Those medications generally considered compatible with aviation duties without restrictions once the possibility of idiosyncratic reaction has been eliminated (generally after a period of ground trial). Applicants using these substances may be cleared to exercise the privileges of their licences by a DAME.

C. Those medications which may be compatible with aviation duties, but which require a specific assessment by CASA. Only CASA can clear pilots and ATCs to use these drugs while performing aviation-related duties.

D. Drugs that are not compatible with flying or ATC duties.

E. Those medications that do not fit any of the above groups, or where there is uncertainty. In such cases, the DAME should either:
   - Contact CASA’s Aviation Medicine Section prior to any decision to certificate or not certificate a licence holder or applicant; or
   - Not endorse the certificate and refer the matter to AMS for determination.
A. Medications compatible with flying or controlling

The following medications may be taken without consultation:

- Simple analgesics such as single doses of aspirin, paracetamol, and ibuprofen to provide analgesia may be used for minor self-limiting conditions. Paracetamol is preferable as there is less risk of gastric irritation. Medications containing Codeine should not be used for this purpose.

- Simple antacids may be used for mild isolated episodes of gastric disturbance. Mixtures containing anticholinergics or antispasmodics should not be used by an applicant engaged in aviation duties. Simple antacids do not include H₂ receptor antagonists.

- Antidiarrhoeals such as kaomagma, kapectate and bismuth subcitrate are acceptable for mild afebrile diarrhoea.

- Nasal sprays such as oxymetazoline or phenylephrine, to be used as a ‘get-me-down’ should unexpected ear or sinus block occur during flight.

- Non-prescription suppositories and topical anorectal ointments/creams used to treat simple haemorrhoids.

- Topical medications including antiseptics, topical acyclovir, antifungals, weak steroid creams or benzoyl peroxide used for minor wounds and skin conditions, vaginal creams/pessaries and suppositories.

**Note:** Schedule 4 (prescription only) items such as topical antibiotics and tretinoin skin applications are not included.

- Oral Contraceptive Pill (combined OCP or mini-pill), injectable progesterone contraceptives and implantable progesterone contraceptives.

- Nicotine gum, patches or sprays used for smoking cessation.

- Steroid nasal sprays used to treat hay fever.

- Moistening or simple astringent eye drops

B. Medications requiring ground trial before DAME approval of use when flying or controlling

Pilots and ATCs taking the following medications require a ground trial (and/or AMS consultation) prior to DAME approval to fly or control:
2.13 Medication – Drugs and Flying/Controlling

- **Anaesthetics.** Medical certificate holders require clearance from a medical practitioner following the administration of any anaesthetic agent:
  - Minimum of 12 hours following local or regional (including dental) anaesthetics. (The condition for which the anaesthetic has been administered must also be considered prior to returning an individual to flying or controlling duties).
  - Minimum of 48 hours following general, spinal or epidural anaesthetic. This proscription includes drug-induced sedation. (The condition for which the anaesthetic etc has been administered must also be considered prior to returning an individual to flying or controlling duties).

- **Hypnotics.** Medical certificate holders should not fly or control for at least 12 hours after ingesting the sleep-inducing agent Temazepam. Medical certificate holders should not fly or control for at least 8 hours after using the sleep-inducing agent Zolpidem. Pilots and ATCs who use Temazepam or Zolpidem should not combine these drugs with alcohol. The use of the sleep-inducing agent Triazolam is not compatible with flying or controlling duties due to its potential CNS side effects. The use of Melatonin is not supported by CASA due to variation in its formulation and variability in its effects.

- **Antibiotics (oral and topical).** Medical certificate holders may continue to undertake flying or controlling duties when taking antibiotics provided:
  - the infectious condition being treated will not significantly interfere with aviation-related activities and will not be exacerbated by the specific operating environment, and
  - the prescribing medical practitioner or DAME has determined there are no adverse drug reactions from the antibiotic which has been prescribed. This would normally involve a short (approximately 48 hour) ground trial or previous use of the same antibiotic.

- **Immunisations.** Medical certificate holders should not undertake aviation-related duties for 24 hours after receiving the following vaccinations (primary and boosters):
  - Adult diphtheria and tetanus
  - Poliomyelitis
  - Hepatitis A & B
  - Measles, mumps, rubella
  - Yellow fever
  - Typhoid
  - Tuberculosis (Mantoux Test or Bacille Calmette-Guerin);
  - Influenza
  - Varicella
  - Meningococcal
  - Pneumococcal
  - Cholera.
Class 3 medical certificate holders receiving these vaccinations will usually remain fit for duty, but should consult a GP or DAME in individual cases of doubt.

After receiving the following immunisations (primary and boosters) there should be no aviation-related duties for a minimum of 72 hours:

- Japanese Encephalitis.

**Non-sedating antihistamines**

**C. Medications which may be compatible with aviation duties, but which require specific assessment by CASA**

For many of the following medications, it is important to note that they will be prescribed to treat particular conditions. Refer to the relevant section regarding certification requirements for that condition as well as to the issues discussed here.

CASA approval is required prior to pilots and ATCs who are taking the following classes of medications returning to flying or controlling duties:

- **Sedating Antihistamines:**
  - These should only be used when there is at least 12 hours between use and commencing aviation-related duties.

- **Antihypertensives:**
  - ACE inhibitors
  - Calcium channel blockers
  - Diuretics
  - Beta blockers.

- **Antiarrhythmics:**
  - Quinidine
  - Disopyramide
  - Verapamil
  - Amiodarone
  - Digoxin.

- **Gout medications:**
  - Allopurinol (colchicine is not usually suitable)
  - Probenecid
  - Non-steroidal anti-inflammatory medications.

- **Hypolipidemic drugs:**
  - HMG-COA reductase inhibitors
  - Gemfibrozil (gemfibrozil and statin medications are not to be used together)
  - Cholestyramine (colestipol is not suitable).
2. Medical Aspects
2.13 Medication – Drugs and Flying/Controlling

- **Ophthalmological preparations:**
  
  It is possible for patients to absorb sufficient beta-blocker through ocular administration to affect cardiovascular response to exertion/exercise.
  
  - Timolol (glaucoma)
  - Betaxolol (glaucoma).

- **Thyroid disease:**
  
  - Thyroxine requires a 14-day trial.

- **Antidepressants.**
  
  - Selected non-sedating selective serotonin reuptake inhibitors (SSRIs) require a minimum of 28 days ground trial. The underlying condition should be considered prior to returning the aviator to duty. MAOIs and tricyclic antidepressants are not generally considered compatible with aviation-related duties. (Also see section 2.6 Psychiatry.)

- **Other medications:**
  
  - Oral acyclovir or famcyclovir for genital herpes
  - Griseofulvin or terbinafine for systemic antifungal therapy requires a 28-day trial. Monthly liver function testing is required
  - Omeprazole for oesophagitis and peptic ulceration maintenance therapy, following endoscopic confirmation of ulcer healing
  - Ranitidine for peptic ulceration maintenance therapy, following endoscopic confirmation of ulcer healing
  - Clomiphene to enhance oogenesis
  - Sucralfate for non-ulcerative GI symptoms
  - Tetracycline (low dose, for long term treatment of acne)
  - Sulfasalazine for prophylaxis of well controlled ulcerative colitis
  - Sulfamethoxazole/trimethoprim for chronic urogenital tract infections.

When these classes of medications are prescribed, the following actions should be taken:

- **Ground trial:** The length of the ground trial will be determined on a case-by-case basis in consultation with CASA Aviation Medical staff, and will also depend on control of the underlying disorder and any side effects of the medication.

- **Consultation:** The DAME should contact CASA Aviation Medicine Section to discuss specific requirements for an applicant using or proposing to use any medication whose side effect profile is unknown or of possible concern.
D. Medications not acceptable for/not compatible with aviation related duties

The following medications are not compatible with aviation related duties and are never to be approved for use by a medical certificate holder without prior specific written approval by CASA.

- Narcotics
- Insulin
- Amphetamine
- Cytotoxics
- Psychotropic medications
- Anticoagulants
- Nitrates
- Complex antidiarrhoeals. Mixtures containing antispasmodics (eg, Lomotil, Imodium) are not usually compatible with aviation-related duties.

E. Other medications such as vitamins, minerals and herbal preparations

Aircrew are to treat herbal medications as they would any other OTC medication. There is a potential for unforeseen consequences when taking such preparations and aircrew and ATCs should consult a DAME for advice before taking such medications and performing aviation-related duties.

Vitamins, minerals and dietary supplements

In Australia, all medicinal therapeutic products must carry an AUST L or AUST R number on the label, unless exempt. Vitamins and minerals are considered listed therapeutic goods meaning quality and safety factors have been assessed by the Therapeutic Goods Administration. In general, pilots and ATCs should not exceed the Recommended Daily Allowances for these products.

Herbal preparations

Herbal preparations are widely available in the community, and are seen by many as a “natural” alternative to conventional medicine. Unfortunately, such agents are not always subject to the same stringent regulations that apply to registered medicinal compounds as noted above. In addition, many of these preparations contain agents that may interact with other drugs and have the potential to cause side effects that are incompatible with flight safety. CASA considers routine use of herbal preparations as being incompatible with flying or controlling duties.
Herbal preparations are derived from plant parts or oils. One should bear in mind that there are no standards for quality, potency, safety or efficacy in their manufacture. Identical products may differ markedly between manufacturers or batches by the same manufacturer. Additionally, many drugs are derived from the same plants used in the herbal preparations. Therefore, many herbal preparations have the same potential side effects as manufactured drugs.

Several herbal preparations present particular threats to aviation safety, alertness, or physical well-being. Below are some of the herbal preparations known to be potentially dangerous.

- **Hallucinogens.** The following may cause hallucinations or disorientation:
  - Californian poppy
  - European mandrake
  - Kava-kava
  - Magic mushrooms
  - Nutmeg (in doses greater than a tablespoon)
  - Periwinkle
  - Thorn apple
  - Yohimbe bark.

- **Sedatives.** The following may cause drowsiness, slow reaction time, or disorientation:
  - Celandine
  - Deadly Nightshade
  - Hemlock
  - Henbane
  - Hops
  - Indian snakeroot
  - Jimson weed
  - Jin bu huan
  - Opium poppy
  - Passion flower
  - Scopolia
  - Skullcap
  - Valerian
  - Wild lettuce
  - Wolfsbane.
Cardiovascular effects. The following may cause heart palpitations or precipitate myocardial ischaemia/infarction.
- Broom
- Ephedra
- Indian snakeroot
- Lily of the Valley
- Pheasant’s eye
- Purple foxglove
- Squill
- Stophanthus
- White squill
- Yellow foxglove.

Liver poisons. The following may cause drowsiness, slow reaction time, or disorientation:
- Borage
- Chapperal
- Colts foot
- Comfrey
- Germander
- Life root
- Thread leafed groundsel.

The DAME often lacks clinical information sufficient to be able to quantify the aeromedical risk from use of herbal preparations. The following questions will be of benefit in evaluating the safety (or otherwise) of these agents:

- Is the use of the preparation due to signs or symptoms that suggest an underlying medical problem separate from the preparation in question?
- Is any component known to have neuropsychotropic effects?
- Is the preparation likely to contain unlabelled or incorrectly labelled ingredients?
- Is the preparation being used in a dose range far outside that of current experience or in an extremely concentrated form?
- Is any component of the preparation known to cause physical harm (even infrequently, unless the quantified incidence of adverse effects is known)?
- Is the preparation an alcohol-based tincture, tonic or elixir?

If all answers are negative, it is difficult to justify prohibition of the particular agent. Any positive answers must be dealt with by education, treating the underlying condition, not endorsing the medical certificate, or referring the matter to Aviation Medicine Section at CASA.
Blank page
2.14  Malignancy

2.14.1 Introduction

Malignancy poses a threat to flight safety for a number of reasons including:

- Direct effect(s) of the primary tumour
- Effect(s) of secondary spread
- Effect(s) of treatment modalities
- Psychological effect
- Cachexia
- Endocrine or Biochemical disturbances.

Any pilot or Air Traffic Controller (ATC) diagnosed with a malignancy must refrain from aviation or air traffic control duties until fitness to return to such duties is assessed by CASA.

Automatic return to flying or controlling status should not be assumed. Some pilots and ATCs may be medically certificated following diagnosis and adequate treatment of their malignancy, provided there is an adequate program of ongoing surveillance. Others will require a lengthy period prior to certification due to ongoing symptoms or the risk of recurrence of the primary or metastatic spread. In some circumstances re-certification will not be approved.

Prior to medical certification on a pilot or ATC suffering from cancer, CASA must be sure that an applicant:

- Has recovered from the primary treatment
- Has no sign of residual tumour, of tumour spread or of secondary manifestations of tumour
- Is psychologically stable enough to undertake aviation duties.

Re-certification will depend on the likelihood and type of recurrent disease and the risk that it will adversely affect flight safety.
2.14.2 Principles of Aeromedical Certification of Pilots/ATCs with Malignancy

When considering the aeromedical risk (and therefore the risk to aviation safety) posed by a pilot or ATC suffering from a malignancy, CASA will evaluate:

- Cancer specific issues such as:
  - The type of cancer (tissue and histological diagnosis)
  - Likelihood of recurrence
  - Site of recurrence
  - Presence of any para-neoplastic syndromes
  - Potential for a recurrence to cause overt or subtle in-flight incapacitation.

- Issues related to the treatment of the cancer.

2.14.3 Cancer Specific Issues

Histological variants of a particular tissue cancer may behave biologically differently from other variants. Therefore, when assessing the aeromedical risk of a pilot or ATC with a malignancy, accurate tissue diagnosis of the malignancy is essential.

Complications of the Malignancy

Potential complications of malignancy will affect CASA’s assessment of fitness for aviation related duties. Malignancy may lead to pain, wasting, neuropathy, nausea, anorexia, seizures, hypercalcaemia, hyperuricaemia, viscus obstruction, and organ failure. Some cancers have para-neoplastic syndromes associated with their presence. These syndromes result from excessive or ectopic hormones synthesized by a tumour, immune complexes, ectopic receptor production, or release of physiologically active compounds and may manifest in a variety of ways. Most para-neoplastic syndromes have serious implications for aviation safety.

Likelihood of Recurrence

Figure 1 depicts the overall survival curve for individuals diagnosed with a theoretical malignancy. For most cancer types, annual recurrence rates can be calculated from survival curves. (As cure following recurrence is rare, overall survival approximates recurrence).
Designated Aviation Medical Examiner's Handbook
2. Medical Aspects
2.14 Malignancy

Approved by Assistant Director, Aviation Safety Standards    Version 3.2: January 2005

Figure 1: Notional Cancer Survival Curve

Staging

Recurrence rates are greatly influenced by the stage of disease when primary treatment occurred. Many cancers are staged using a TNM (Tumour, Node, Metastasis) classification. Figure 2 depicts the variation in survival rates for a theoretical cancer according to the degree of spread evident at diagnosis.

Figure 2: Notional survival rates from a cancer according to stage at diagnosis

Tumour Marker

Tumours may synthesize proteins that produce no clinical symptoms, eg, β-human chorionic gonadotropin, α-fetoprotein, carcinoembryonic antigen, CA 125, and CA 153. These protein products may be used as tumour markers in the serial evaluation of patients for determining disease recurrence or response to therapy. These markers may assist CASA in assessing the suitability of a pilot or ATC to return to aviation duty, as they can often be valuable in tracking response to treatment or recurrence of disease.
Site of recurrence

Each tumour has a characteristic pattern of recurrence. Thus for a theoretical tumour, metastases might occur according to the distribution indicated in Table 1.

Table 1: Distribution of metastasis for a theoretical cancer

<table>
<thead>
<tr>
<th>Site</th>
<th>Incidence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local and lymph nodes</td>
<td>60</td>
</tr>
<tr>
<td>Liver</td>
<td>20</td>
</tr>
<tr>
<td>Lung</td>
<td>10</td>
</tr>
<tr>
<td>Bone</td>
<td>5</td>
</tr>
<tr>
<td>Bone marrow</td>
<td>3</td>
</tr>
<tr>
<td>Brain</td>
<td>2</td>
</tr>
</tbody>
</table>

Risk of particular metastasis causing incapacitation

Several assumptions are made when assessing the risk of a particular metastasis causing incapacitation (either subtle or overt). For a theoretical cancer, recurrence in a regional lymph node carries a relatively small risk of incapacitation. On the other hand, brain metastasis has a near-100% potential for incapacitation (whether sudden due to a fit or bleed, or subtle as a result of pressure effects or headache etc). Thus the incapacitation risk weighting for a theoretical cancer may be as depicted in Table 2.

Table 2: Notional risk of incapacitation from metastasis

<table>
<thead>
<tr>
<th>Site</th>
<th>Incapacitation weighting (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local and lymph nodes</td>
<td>1</td>
</tr>
<tr>
<td>Liver</td>
<td>5</td>
</tr>
<tr>
<td>Lung</td>
<td>5</td>
</tr>
<tr>
<td>Bone</td>
<td>5</td>
</tr>
<tr>
<td>Bone marrow</td>
<td>20</td>
</tr>
<tr>
<td>Brain</td>
<td>100</td>
</tr>
</tbody>
</table>

Total risk of incapacitation

From the parameters defined above, a total risk of incapacitation can be calculated:

- Recurrence rate per year for the particular stage of the malignancy
- Frequency of metastatic disease in a particular organ
- Risk that metastasis in that organ will cause incapacitation.
2.14 Malignancy

Thus for an early stage cancer, the result of a calculation of the risk of incapacitation from brain metastasis may be:

\[
3\% \times 3\% \times 100\% = 0.09\% \text{ for the first year}
\]

For a theoretical late stage cancer from bone marrow metastases, the risk may be:

\[
15\% \times 3\% \times 100\% = 0.45\% \text{ for the first year.}
\]

In order to determine the overall risk, it is necessary to add the risks from all the possible recurrence sites.

2.14.4 Treatment Related Issues

In general, cancer is treated in one (or a combination) of the following ways:

- **Surgery** is the commonest treatment for malignant disease, and often is the only treatment. Aeromedical certification after surgery for cancer depends on the extent and success of the operation. Complications of surgery are considered on their merits, taking into account the underlying medical condition and the overall health of the affected individual.

- **Radiotherapy** is usually delivered as an intensive course. The aim may be curative, for example where an isolated group of lymph nodes have been shown to contain malignant cells, or as adjuvant therapy where lymph nodes are assumed to contain metastatic tumour. During the active part of radiotherapy treatment, pilots and ATCs will be assessed as temporarily unfit for duty. Following radiotherapy many patients suffer non-specific systemic effects, such as tiredness, malaise and nausea, which makes it inappropriate for them to partake in aviation activities at least until such effects have resolved. Occasionally there are long-term effects after radiotherapy, such as scarring, which may preclude fitness for aviation duties.

- **Chemotherapy.** During acute chemotherapy treatment (whether curative or adjuvant), pilots and ATCs will be assessed as temporarily unfit, as all chemotherapy drugs are cytotoxic, and frequently have a significant effect on normal tissue, such as rapidly dividing cells in the bone marrow. Once active chemotherapy has ceased and side effects have resolved, aeromedical certification may be possible and will be considered on a case-by-case basis. In some cases low doses of chemotherapy agents may be prescribed as maintenance therapy. Where CASA considers that such medications do not reduce aviation safety, aeromedical certification may be considered, also on a case-by-case basis.
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2.14 Malignancy

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- **Hormonal therapy.** Endocrine therapy is used as part of the treatment of some cancers (such as hormone and anti-hormone treatment following breast and prostate cancer). Pilots and ATCs may be returned to flying or controlling if there are no side effects from their hormonal therapy. In all cases, the decision to return to duty while on cancer chemotherapy will be made by CASA Aviation Medicine Section (AMS), on a case-by-case basis, when absence of adverse disease effects is confirmed.

- **Complementary or alternative medicine.** These modalities are commonly used by patients in the treatment of malignancy, particularly where the primary treatment modalities have failed to produce a cure. Where such treatments are used in the presence of continued active disease, the applicant is assessed as unfit. Where the treatment is used to prevent onset of malignancy or recurrence, the treatment will be considered on a case-by-case basis, with regard to the individual's overall health and the potential effect of the treatment. Herbal medications are discussed in Section 2.13 Medication. All such cases should be referred to CASA AMS for consideration.

### 2.14.5 Specific Malignancies

The commonest forms of malignant disease in the Australian pilot and ATC population are (in order):

- Prostate cancer
- Malignant melanoma
- Bowel (colon) cancer
- Non-Hodgkin’s lymphoma
- Cancer of the testis (multiple types)
- Bladder cancer
- Kidney cancer
- Cancer of the rectum/anus
- Breast cancer
- Hodgkin’s lymphoma.

The following discussion relates to the five most commonly encountered malignancies in the aviation population in Australia, as well as Hodgkin’s Disease. Information on re-certification following diagnosis with such malignancies is to be taken as guidance and indicative only. CASA will address each case individually and make a decision based on its unique issues. In general, DAMEs and certificate applicants may anticipate an outcome along the lines described as a way to plan for possible grounding periods. Applicants should endeavour to provide specialist evidence and opinion to refute the guidance below should there be a request to return to multi-crew or solo flying or controlling prior to the times indicated.
Prostate Cancer

Adenocarcinoma of the prostate is the commonest malignancy in men aged 50 years or more in Australia, and the incidence increases with each decade of life. Hormonal influences undoubtedly play a role in the aetiology of adenocarcinoma. Grading is based on architectural patterns and is commonly reported as the Gleason score: the primary (most prevalent) grade (1-5) plus the secondary (next most prevalent) grade (1-5); thus, it ranges from 2 (very well differentiated) to 10 (very poorly differentiated). Staging is described in Table 3.

Table 3: Staging of prostatic cancer

<table>
<thead>
<tr>
<th>Staging System</th>
<th>Characteristics of Tumour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whitmore</td>
<td>Whitmore AJCC/TNM</td>
</tr>
<tr>
<td>A</td>
<td>T1</td>
</tr>
<tr>
<td></td>
<td>T1a</td>
</tr>
<tr>
<td></td>
<td>T1b</td>
</tr>
<tr>
<td></td>
<td>T1c</td>
</tr>
<tr>
<td>B</td>
<td>T2</td>
</tr>
<tr>
<td></td>
<td>T2a</td>
</tr>
<tr>
<td></td>
<td>T2b</td>
</tr>
<tr>
<td>C</td>
<td>T3</td>
</tr>
<tr>
<td></td>
<td>T3a</td>
</tr>
<tr>
<td></td>
<td>T3b</td>
</tr>
<tr>
<td>D</td>
<td>T4</td>
</tr>
</tbody>
</table>

AJCC = American Joint Committee on Cancer
TNM = tumour node metastasis

Symptoms, Signs, and Diagnosis

Prostatic cancer is usually slowly progressive and may cause no symptoms. In late disease, symptoms of bladder outlet obstruction, ureteral obstruction, and hematuria may appear. Metastases to the pelvis, ribs, and vertebral bodies may cause bone pain. Carcinoma is often diagnosed incidentally when malignant changes are found in the tissue removed during surgery for suspected benign prostatic enlargement.

Elevated serum acid phosphatase or Roy test (an enzymatic method) correlates well with the presence of metastatic prostate cancer, particularly in lymph nodes. Although acid phosphatase and Prostatic Specific Antigen (PSA) levels decline after treatment and rise with recurrence, PSA is the more sensitive marker for monitoring cancer progression and response to therapy. However, because serum PSA is moderately elevated in 30 to 50\% of patients with benign prostatic hyperplasia (depending on prostate size and degree of obstruction) and in 25 to 92\% of those with prostate cancer (depending on tumour volume), its role in early detection and staging is unclear. Significantly elevated PSA levels suggest extracapsular extension of tumour or metastases.
Prognosis and Treatment

Long-term local control—even cure—is possible. However, the potential for cure, even in patients with clinically localized cancer, depends on factors such as grade, stage, and pretreatment PSA level. For patients with low-grade, organ-confined tumours, survival is virtually identical to that for age-matched controls without prostate cancer.

Most patients elect to undergo definitive therapy with radical prostatectomy or radiotherapy. Radical prostatectomy is probably optimal for younger patients with longer life expectancy; they have the lowest risk of urinary incontinence. Radiotherapy may offer comparable results, especially in patients with low pretreatment PSA levels.

An asymptomatic patient with a locally advanced tumour or metastases may benefit from hormonal therapy with or without adjuvant radiotherapy. Hormonal therapy rarely uses exogenous estrogens, which pose an increased risk of cardiovascular and thromboembolic complications.

Medical Certification

Cancer of the prostate has a generally good prognosis, and tends to metastasise locally or to bone. Once primary treatment has been completed, certification will be possible where:

- There is no evidence of metastatic spread
- PSA has returned to normal
- There are no significant consequences of treatment, such as incontinence.

Should there be metastatic spread which has been controlled and PSA has returned to less than 10, certification will also be considered. Certification will be for no more than 12 months. Each CASA medical examination and report must be accompanied by a progress report from a urologist or oncologist, and a recent PSA level. If the applicant shows no signs of recurrence after three years from initial diagnosis, no further follow-up is required. Where there is metastatic spread surveillance will likely be lifelong. Provided no other medical conditions preclude it, there can be a return to regular certification procedures for age and Class.

Malignant Melanoma

Malignant melanoma is the second commonest malignancy in the Australian aircrew and ATC population. The incidence is rising. Sun exposure is a risk, as is family history and the occurrence of lentigo maligna, large congenital melanocytic naevus, and the dysplastic naevus syndrome.

About 40 to 50% of malignant melanomas develop from pigmented moles. Almost all of the rest arise from melanocytes in normal skin. Signs of malignant transformation should be carefully sought: change in size; change in colour, especially spread of red, white, and blue pigmentation to surrounding normal skin; change in surface characteristics, consistency, or shape; and signs of inflammation in surrounding skin, with possible bleeding, ulceration, itching, or pain.
Malignant melanomas vary in size, shape, and colour (usually pigmented) and in their propensity to invade and metastasize. This neoplasm may spread rapidly, causing death within months of its recognition, yet the 5-year cure rate of early, very superficial lesions is nearly 100%. Cure depends on early diagnosis and early treatment. The major types of malignant melanoma are:

- Lentigo maligna melanoma
- Superficial spreading melanoma: accounts for 2/3 of malignant melanomas
- Nodular melanoma: constitutes 10 to 15% of malignant melanomas

**Prognosis and Treatment**

Two classification systems are useful for evaluating melanomas:

- Melanoma thickness as measured from the granular layer of the epidermis to the greatest depth of tumour invasion, as described by Breslow.
- Anatomic level of invasion, as described by Clark. In Clark's classification, level I is confined to epidermis; level II extends into papillary dermis; level III extends further into papillary dermis, with expansion of this layer; level IV extends into reticular dermis; and level V extends into subcutaneous fat.

 Increased Breslow thickness and deeper invasion (Clark level) correlate with poorer prognosis. The clinical type of tumour is less important to survival than the thickness of the tumour at the time of diagnosis.

Metastatic spread of melanoma occurs both via lymphatics and blood vessels. Local spread results in formation of nearby satellite papules or nodules that may or may not be pigmented. Direct metastasis to skin or internal organs may occur, and occasionally metastatic nodules or enlarged lymph nodes are discovered before the primary lesion is identified. Melanomas arising from mucous membranes have a very poor prognosis, although they often seem quite limited when discovered.

Treatment is by surgical excision. Although the width of margins is debated, most experts agree that a 1-cm lateral tumour-free margin is adequate for lesions <1 mm thick. Thicker lesions may deserve more radical surgery and sentinel node biopsy.

Thick malignant melanomas and regional or distant metastasis may be treated with chemotherapy. Prognosis is poor.
Table 4: Five-year survival for malignant melanoma

<table>
<thead>
<tr>
<th>Tumour Thickness (mm) *</th>
<th>5-Year Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76</td>
<td>98 - 100</td>
</tr>
<tr>
<td>0.76 - 1.5</td>
<td>90 - 94</td>
</tr>
<tr>
<td>1.51 – 2.25</td>
<td>83 – 84</td>
</tr>
<tr>
<td>2.26 – 3.0</td>
<td>72 – 77</td>
</tr>
<tr>
<td>&gt; 3.0</td>
<td>46</td>
</tr>
</tbody>
</table>

* Tumour thickness is very difficult to assess if histological signs of regression are present.

Aeromedical Certification

Following diagnosis of a malignant melanoma, CASA will not certificate a pilot or ATC for the first 12 months because of the risk of spread to organs such as the brain, lungs or bone. The associated risk of incapacitation is significant. In some circumstances where the prognosis is extremely positive, certification prior to 12 months may be considered.

Class 1 and 3: In the absence of recurrence, CASA will usually approve Class 1 and 3 certification as follows:

Table 5: Post-malignant melanoma certification (Class 1 and 3)

<table>
<thead>
<tr>
<th>Tumour thickness</th>
<th>Certification</th>
<th>Period post-diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>0.76 – 1.49 mm</td>
<td>Multicrew</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>24 months</td>
</tr>
<tr>
<td>1.5 – 2.24 mm</td>
<td>Multicrew</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>36 months</td>
</tr>
<tr>
<td>2.25 – 3.0 mm</td>
<td>Multicrew</td>
<td>24 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>48 months</td>
</tr>
<tr>
<td>&gt; 3.0 mm</td>
<td>Multicrew</td>
<td>24 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>60 months</td>
</tr>
</tbody>
</table>
Class 2: In the absence of recurrence, CASA will usually approve Class 2 certification as follows:

<table>
<thead>
<tr>
<th>Tumour thickness</th>
<th>Certification</th>
<th>Period post-diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.76 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>0.76 – 1.49 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>1.5 – 2.24 mm</td>
<td>Solo</td>
<td>12 months</td>
</tr>
<tr>
<td>2.25 – 3.0 mm</td>
<td>As or with co-pilot</td>
<td>12 months</td>
</tr>
<tr>
<td>&gt; 3.0 mm</td>
<td>As or with co-pilot</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>24 months</td>
</tr>
<tr>
<td></td>
<td>Solo</td>
<td>36 months</td>
</tr>
</tbody>
</table>

Certification will be for no more than 12 months, and renewal medical examinations and reports must be accompanied by a progress report from the treating dermatologist or oncologist. These reports will be required for at least 3 years following return to unrestricted duties.

**Colorectal (Bowel) Cancer**

In Western countries, cancers of the colon and rectum account for more new cases of cancer per year than cancer of any other anatomical site except the lung. Colorectal cancer is the most frequent cause of death from visceral malignancies that affect both sexes. The incidence of this condition begins to rise at age 40 and peaks at age 60 to 75 years. Colorectal cancer spreads by direct extension through the bowel wall, haematogenous metastasis, regional lymph node metastasis, perineural spread, and intraluminal metastasis.

**Symptoms, Signs, and Diagnosis**

Adenocarcinoma of the colon and rectum grows slowly, and a long interval elapses before it is large enough to produce symptoms. Early diagnosis depends on routine examination. Symptoms depend on the lesion's location, type, extent, and complications. In cancer of the rectum, the commonest presenting symptom is bleeding with defecation. Whenever rectal bleeding occurs, even with obvious haemorrhoids or known diverticular disease, coexisting cancer must be excluded. Simple, inexpensive testing of the stool for occult blood is advised as part of both screening and high-risk surveillance programs.

Elevated serum carcinoembryonic antigen (CEA) is not specifically associated with colorectal cancer, but levels are high in 70% of affected patients. If CEA is high preoperatively, and low after removal of a colon tumour, monitoring CEA may help to detect recurrence.
Treatment and Prognosis

Primary treatment consists of wide surgical resection of the colon cancer and regional lymphatic drainage. The choice of operation for rectal cancer depends on the tumour's distance from the anus and gross extent. Abdominoperineal resection of the rectum requires a permanent sigmoid colostomy. Surgical cure is possible in 70% of patients. The best 5-yr survival rate for cancer limited to the mucosa approaches 90% (stage I, Dukes’ A); with penetration of the muscularis propria, 80% (stage II, Dukes’ B); with positive lymph nodes, 30% (stage III, Dukes’ C).

Medical Certification

Issues dealing with colostomy and ileostomy are found in Section 2.9 Gastroenterology.

Following diagnosis of a bowel cancer, CASA will not usually certificate a pilot or ATC for the first 12 months because of the risk of spread to organs such as the brain, lungs or bone and the associated risk of incapacitation is significant. CASA will require the following information when considering the fitness of a pilot or ATC to return to aviation-related duties following the diagnosis of colorectal cancer: an annual report from the treating gastroenterologist and/or oncologist, including tissue diagnosis, staging and CEA level, for at least 5 years post-diagnosis.

In the absence of recurrence, CASA will usually approve certification as follows:

Stage I

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>6 months</td>
</tr>
<tr>
<td>Solo</td>
<td>24 months</td>
</tr>
</tbody>
</table>

Class 2

| Solo | 6 months |

Stage II

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>12 months</td>
</tr>
<tr>
<td>Solo</td>
<td>36 months</td>
</tr>
</tbody>
</table>

Class 2

| Solo | 12 months |
Stage III

<table>
<thead>
<tr>
<th>Class 1 and 3</th>
<th>Post-treatment period</th>
</tr>
</thead>
<tbody>
<tr>
<td>As or with co-pilot/no solo controlling</td>
<td>24 months</td>
</tr>
<tr>
<td>Solo</td>
<td>648 months</td>
</tr>
<tr>
<td>Class 2</td>
<td></td>
</tr>
<tr>
<td>As or with co-pilot</td>
<td>12 months</td>
</tr>
<tr>
<td>Solo</td>
<td>24 months</td>
</tr>
</tbody>
</table>

**Non-Hodgkin’s Lymphoma**

Non-Hodgkin’s Lymphoma is a malignant monoclonal proliferation of lymphoid cells in sites within the immune system, including lymph nodes, bone marrow, spleen, liver, and gastrointestinal tract. Pathological classification of non-Hodgkin’s lymphomas (NHL) is evolving, reflecting new insights into the cells of origin and the biological bases of these heterogeneous diseases. The course of NHL varies from indolent and initially well tolerated to rapidly fatal.

**Incidence and Aetiology**

NHL occurs more often than Hodgkin's disease. Its cause is unknown, although, as with the leukaemias, substantial experimental evidence suggests a viral cause for some lymphomas. Primary CNS involvement and disseminated disease occur. In about 30% of cases, the lymphomas are preceded by generalized lymphadenopathy.

**Pathology**

The Working Formulation classifies NHL into prognostic categories having therapeutic implications as follows:

- **Low-grade lymphomas** (38%): Diffuse, small lymphocytic; follicular, small-cleaved cell; follicular mixed, small and large cell.
- **Intermediate-grade lymphomas** (40%): Follicular large cell; diffuse, small-cleaved cell; diffuse mixed, small and large cell; diffuse large cell.
- **High-grade lymphomas** (20%): Immunoblastic lymphoma; lymphoblastic lymphoma; small non-cleaved cell lymphoma (Burkitt’s and non-Burkitt's types).
- **Miscellaneous lymphomas** (2%): Composite lymphomas; mycosis fungoides; true histiocytic; other, and unclassifiable types.
Symptoms and Signs
Although various clinical manifestations of NHL occur, many patients present with asymptomatic peripheral lymphadenopathy. Enlarged lymph nodes are rubbery and discrete and later become matted. Local disease is apparent in some patients, but most have multiple areas of involvement. Anaemia is initially present in about 33% of patients and eventually develops in most.

Staging
Localised NHL does occur, but the disease is disseminated when first recognized in about 90% of follicular lymphomas and 70% of diffuse lymphomas. The final staging of NHL is similar to that of Hodgkin's disease; however, it is more often based on clinical than pathological findings.

Table 7: Ann Arbor Staging of Hodgkin's Disease and Non-Hodgkin's Lymphoma

<table>
<thead>
<tr>
<th>Stage *</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>In one lymph node only</td>
</tr>
<tr>
<td>II</td>
<td>In two or more lymph nodes on the same side of the diaphragm</td>
</tr>
<tr>
<td>III</td>
<td>In the lymph nodes, spleen, or both and on both sides of the diaphragm</td>
</tr>
<tr>
<td></td>
<td>1 Above the renal vessels (eg, spleen; splenic, hilar, coeliac and portal nodes)</td>
</tr>
<tr>
<td></td>
<td>2 In the lower abdomen (periaortic, pelvic, or inguinal nodes)</td>
</tr>
<tr>
<td>IV</td>
<td>Extranodal involvement (eg, bone marrow, lung, liver)</td>
</tr>
</tbody>
</table>

*Subclassification E indicates extranodal involvement adjacent to an involved lymph node (eg, disease of mediastinal nodes and hilar adenopathy with adjacent lung infiltration is classified as stage IIE). Stages can be further classified by A to indicate the absence; or B to indicate the presence of constitutional symptoms (weight loss, fever, or night sweats). B symptoms generally occur with stages III and IV (20 to 30% of patients).

Initially, constitutional symptoms tend to be less common in NHL than in Hodgkin's disease and do not usually alter prognosis. Organ infiltration is more widespread in NHL, and the bone marrow and peripheral blood may be involved.

Prognosis and Treatment
The histopathology, stage of disease, and results of surface marker studies significantly influence the prognosis and response to treatment. Patients with T-cell lymphomas generally have a worse prognosis than those with B-cell types. Other factors that adversely affect prognosis are poor performance status, age >60 years, elevated LDH level, bulky tumour masses (diameter >10 cm), and more than two extranodal sites of disease.

A prognostic index for diffuse mixed, diffuse large cell, and immunoblastic lymphomas has been reported. The International Prognostic Index (IPI) considers five categories: age, performance status, LDH level, number of extranodal sites, and stage. Prognostic groups of low, low intermediate, high intermediate, and high risk may be defined.
Table 8: Outcome According to Risk Group as Defined by the International Prognostic Index

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Risk Factors (n)</th>
<th>Patients * (%)</th>
<th>Complete Response (%)</th>
<th>2-Yr Relapse-Free Survival (%)</th>
<th>5-Yr Relapse-Free Survival (%)</th>
<th>2-Yr Survival (%)</th>
<th>5-Yr Survival (%)</th>
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<tr>
<td>Low</td>
<td>0 or 1</td>
<td>35</td>
<td>87</td>
<td>79</td>
<td>70</td>
<td>84</td>
<td>73</td>
</tr>
<tr>
<td>Low - intermediate</td>
<td>2</td>
<td>27</td>
<td>67</td>
<td>66</td>
<td>50</td>
<td>66</td>
<td>66</td>
</tr>
<tr>
<td>High - intermediate</td>
<td>3</td>
<td>22</td>
<td>55</td>
<td>59</td>
<td>49</td>
<td>54</td>
<td>51</td>
</tr>
<tr>
<td>High</td>
<td>4 or 5</td>
<td>16</td>
<td>44</td>
<td>58</td>
<td>40</td>
<td>34</td>
<td>26</td>
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</tbody>
</table>


A cure may be expected in 30 to 50% of affected patients with intermediate- and high-grade lymphomas undergoing myeloablative therapy. In low-grade lymphomas, it remains uncertain whether cure may be obtained with transplantation, although their survival rate is better than that of patients receiving secondary palliative therapy alone.

**Medical Certification**

Without a complete remission, return to aviation duties will not usually be considered. Once in remission, certification will usually be conducted on a case-by-case basis, using Table 9 (see next page) as a guide. The high rate of late recurrence limits the likelihood of an unrestricted Class 1 or Class 3 certification.

Table 9: Post-remission certification

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Class 1 &amp; 3 solo</th>
<th>Class 1 &amp; 3 multi-crew/no solo controlling</th>
<th>Class 2 solo</th>
<th>Class 2 as or with co-pilot</th>
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</thead>
<tbody>
<tr>
<td>Low</td>
<td>4 years</td>
<td>2 years</td>
<td>2 years</td>
<td>1 year</td>
</tr>
<tr>
<td>Low - intermediate</td>
<td>5 years</td>
<td>2 years</td>
<td>3 years</td>
<td>1 year</td>
</tr>
<tr>
<td>High - intermediate</td>
<td>Certification unlikely</td>
<td>2 years</td>
<td>4 years</td>
<td>2 years</td>
</tr>
<tr>
<td>High</td>
<td>Certification unlikely</td>
<td>2 years</td>
<td>5 years</td>
<td>3 years</td>
</tr>
</tbody>
</table>

Timing is after a complete remission has been obtained.

Applications for renewal of a medical certificate must be accompanied by a progress report from the treating haematologist or oncologists detailing treatment, prognosis and current health. Certification will be for a maximum of 12 months until at least 5 years post-re-certification, and at least 3 years following return to unrestricted duties.
Hodgkin’s Disease

Hodgkin’s Disease is a localised or disseminated malignant proliferation of tumour cells arising from the lymphoreticular system, primarily involving lymph node tissue and bone marrow.

Incidence and Aetiology

Hodgkin’s disease has a bimodal age distribution that peaks at ages 15 to 34 and after age 60. However, the second peak may be an artefact of inaccurate diagnosis, because most cases diagnosed after age 60 are intermediate-grade non-Hodgkin’s lymphomas.

Pathology

Diagnosis depends on identification of Reed-Sternberg cells (large binucleated cells) in lymph nodes or at other sites.

Table 10: Histopathological Subtypes of Hodgkin’s Disease

<table>
<thead>
<tr>
<th>Type</th>
<th>Appearance</th>
<th>Incidence</th>
<th>Progression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lymphocyte predominant</td>
<td>Few Reed-Sternberg cells and many lymphocytes</td>
<td>3%</td>
<td>Relatively slow or indolent</td>
</tr>
<tr>
<td>Nodular sclerosis</td>
<td>Dense fibrous tissue surrounds nodules of Hodgkin’s tissue</td>
<td>67%</td>
<td>Intermediate or moderately progressive; relatively slow or indolent (occasionally)</td>
</tr>
<tr>
<td>Mixed cellularity</td>
<td>A moderate number of Reed-Sternberg cells with a mixed background infiltrate</td>
<td>25%</td>
<td>Intermediate or moderately progressive; aggressive</td>
</tr>
<tr>
<td>Lymphocyte-depleted</td>
<td>Numerous Reed-Sternberg cells and extensive fibrosis</td>
<td>5%</td>
<td>Aggressive</td>
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</table>

Symptoms and Signs

Symptoms and signs primarily relate to the site, amount, and extent of nodal mass involvement. Most patients present with cervical and mediastinal adenopathy and without systemic complaints. Other manifestations develop as the disease spreads through the reticuloendothelial system, generally among contiguous sites. The rate of progression varies according to histopathological subtype.

Diagnosis

Hodgkin’s disease can be definitively diagnosed by lymph node biopsy that reveals Reed-Sternberg cells in a characteristic histological setting. Hodgkin’s disease may be difficult to differentiate from lymphadenopathy caused by infectious mononucleosis, toxoplasmosis, cytomegalovirus, NHL, or leukaemia.
Staging

Radiotherapy, chemotherapy, or a combination of both is potentially curative, but the extent or stage of disease must first be determined. The Ann Arbor staging system (see Non-Hodgkin’s Lymphoma) is commonly used.

Treatment

Chemotherapy or radiotherapy regimens cure most patients.

- **Stage I and IIA disease** can be treated with radiotherapy. Such treatment cures about 80% of patients. Cure refers to being disease-free at 5 years post-therapy, after which relapse is very rare.
- For **stage IIIA1 disease**, total nodal irradiation results in an overall survival of 85 to 90%, with disease-free survival of 65 to 75% at 5 years.
- For **stage IIIA2 disease**, combination chemotherapy is generally used with or without radiotherapy of bulky nodal sites. Cure rates of 75 to 80% have been achieved.
- Because radiotherapy alone does not cure **stage IIIB disease**, combination chemotherapy alone or in conjunction with radiotherapy is required. Survival ranges from 70 to 80% (at 5 years).
- For **stage IVA and B disease**, combination chemotherapy has produced a complete remission in 70 to 80% of patients, with >50% remaining disease-free at 10 to 15 years. Patients who fail to achieve complete remission or who relapse within 6 to 12 months have a poor prognosis.

Medical Certification

CASA will not usually consider certification until at least 12 months following successful treatment. “Successful treatment” requires that the disease be in complete remission. Table 11 (below) provides guidance on the likely time before CASA will consider certification, assuming that there are no other significant health issues, no side effects from the treatment and ongoing complete remission or “cure” has been effected. All renewal medical examinations and reports must be accompanied by a progress report from the treating haematologist or oncologist.

**Table 11: Likely certification timings**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Class 1 &amp; 3 solo</th>
<th>Class 1 &amp; 3 multi-crew/no solo controlling</th>
<th>Class 2 solo</th>
<th>Class 2 as or with co-pilot</th>
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<tr>
<td>I and IIA</td>
<td>1 year</td>
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<td>1 year</td>
<td>6 months</td>
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<td>6 months</td>
</tr>
<tr>
<td>IIIA2</td>
<td>3 years</td>
<td>2 years</td>
<td>2 years</td>
<td>1 year</td>
</tr>
<tr>
<td>IIIB and IV</td>
<td>4 years</td>
<td>2 years</td>
<td>3 years</td>
<td>1 year</td>
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</table>
**Testicular Cancer**

Testicular tumours account for most solid tumours in males aged less than 30 years. Malignant testicular tumours arise from the primordial germ cell and differentiate to reveal seminoma, teratoma, embryonal carcinoma, endodermal sinus tumour (yolk sac tumour), and choriocarcinoma.

**Symptoms, Signs, and Diagnosis**

The usual presenting sign is a scrotal mass, sometimes associated with pain. Many patients discover the mass in association with minor trauma. Haemorrhage into the tumour may produce local pain and tenderness. Any firm mass in the testis is cause for immediate clinical suspicion of testicular tumour. Diagnostic studies should include radioimmunoassays for α-fetoprotein and β-human chorionic gonadotropin. These markers, when elevated, indicate the presence of tumour; they are also valuable in follow-up of patients with proven testicular tumours, especially the non-seminomatous types.

**Prognosis and Treatment**

Prognosis depends on the histology and extent of the tumour. Survival rates are >95% at 5 years for seminomas and non-seminomas localized to the testis or low-volume metastases in the retroperitoneum. The 5-year survival rate for extensive retroperitoneal metastases or pulmonary or other visceral metastases is poorer and varies with site, volume, and histology of the metastases.

Radical (inguinal) orchidectomy, the cornerstone of treatment, provides important histopathological information for planning further therapy. These parameters can accurately predict the risk of occult lymph node metastases; so low-risk patients with normal x-rays and biomarkers may be candidates for surveillance protocols, especially patients with non-seminomatous germ cell tumours rather than seminomas. Otherwise, standard treatment for seminoma is irradiation after unilateral orchidectomy. For non-seminomatous germ cell tumours, standard treatment is retroperitoneal lymph node dissection.

**Medical Certification**

**Stage 1 (non-metastatic disease):**

- *Teratoma with orchidectomy only.* Following recovery from the surgery, unrestricted Class 1, 2 or 3 is usual. For the first 24 months, certification is for 6 months at a time. Each medical is to be accompanied by a report from urologist or oncologist, along with tumour marker levels. Tumour markers will usually rise before any anatomical disease is identifiable. After two years without recurrence, this can increase to12 monthly certification, until 5 years post-diagnosis.
2.14 Malignancy

- **Seminoma with orchidectomy only.** There is a 15% relapse rate. This is usually monitored by serial CT or MRI scans. Unrestricted Class 1 or 3 certification will be delayed for 24 months post-surgery. Restricted Class 1 and 3 and unrestricted Class 2 is possible from recovery after surgery. Certification will be for 6 months for the first two years, then annual until 5 years post-diagnosis.

- **Seminoma with orchidectomy and radiotherapy.** As the cure rate is greater than 99%, unrestricted Class 1, 2 and 3 certification is possible as soon as the individual has recovered from the primary treatment. Certification again will be for 6 months for the first 2 years, then annual, and the medical must be accompanied by a progress report from the treating urologist or oncologist.

**Stage II/III (local metastatic disease):** The prognosis remains good compared with most other malignancies.

*Table 12: Stage II/III (local metastatic disease)*

| Class 1/3 multi-crew/no solo controlling | Following recovery from primary treatment and disease free |
| Class 1/3 solo | 12 months following successful treatment |
| Class 2 as or with co-pilot | Following recovery from primary treatment and disease free |
| Class 2 solo | 6 months following successful treatment |

Renewal medical examinations and reports must be accompanied by a progress report from the treating specialist.

**Stage IV (disseminated disease):** Although 5-year survival is around 60-70%, this outcome is usually achieved only by prolonged chemotherapy. While chemotherapy is required, there will be no certification.

*Table 13: Stage IV (disseminated disease)*

| Class 1/3 multi-crew/no solo controlling | 24 months following successful treatment |
| Class 1/3 solo | Certification unlikely |
| Class 2 as or with co-pilot | 12 months after last treatment and continued disease free |
| Class 2 solo | 24 months following successful treatment |

Renewal medical examinations and reports must be accompanied by a progress report from the treating specialist.

**Other Malignancies**

This section is not intended to provide detailed advice for all possible malignancies. Other malignancies may be discussed in the relevant organ system section of this *Handbook.* Otherwise, the guiding principles outlined above should be used. Where doubt exists, discussion with, or referral to, CASA Aviation Medicine Section should be undertaken immediately.
2.15 Differences between Australian Medical Certification and ICAO Medical Certification for International Operations

2.15.1 Currency of Medical Certification

ICAO commences periods of currency from the date of the medical examination, not from the date of CASA's assessment nor from the applicant's anniversary date. As an aide-memoire to applicants, CASA's medical certificates record the date on which the applicant's most recent medical examination was performed, to assist calculation of the medical certificate's currency for ICAO purposes. (See the Note below.)

2.15.2 Duration of Medical Certification

Class 1 medical certificates
For applicants with ATPL who are aged 40 years or more, ICAO demands a medical examination by a DAME every six months. That is, the currency of medical certification for this group extends for only six months from the date of the most recent medical examination.

Class 2 medical certificates
ICAO demands a medical examination by a DAME every two years for all Class 2 medical certificate holders. That is, the currency of medical certification for this group extends for only two years from the date of the most recent medical examination.

As an aide-memoire to applicants, CASA's medical certificates record the date on which the applicant's most recent medical examination was performed, to assist calculation of the medical certificate's currency for ICAO purposes. (See the Note below.)

Note: This has no effect on the notified currency of medical certificates when exercising licence privileges within Australian airspace.

This advice is provided to all Class 1 or Class 2 medical certificate holders whenever a CASA medical certificate is issued.
3.1.1 Questions to be Asked of CASA Employees for Superannuation Medicals

The following are questions to be asked during Superannuation Medicals (Class 3 Medical Certificate holders and pilots to be employed by CASA).

1. Have you ever been rejected:
   a. As a risk for life insurance?
   b. For admission to any employment for health reasons?
   c. For entry into any superannuation scheme?

2. Have you ever been retired or have your services ever been terminated from any employment on medical or invalidity grounds?

3. Are you receiving, or have you ever received:
   a. A pension or any other benefit from the Commonwealth Superannuation Scheme, the Defence Force Retirement and Death Benefits Scheme, or any other government or private superannuation scheme?
   b. Workers’ or employees’ compensation?
   c. A Social Security invalidity pension or sickness benefit?
   d. A Repatriation service pension?
   e. A Repatriation disability pension? If so, please state award rate.
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4. Aviation Medicine Telephone Numbers and Addresses

4.1 Telephone List

4.1.1 Aviation Medicine Telephone Contact as at December 2000

<table>
<thead>
<tr>
<th>Service</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>CASA National Office</td>
<td>131 757</td>
</tr>
<tr>
<td>Inquiries</td>
<td>(02) 6217 1641</td>
</tr>
<tr>
<td>Facsimile</td>
<td>(02) 6217 1640</td>
</tr>
</tbody>
</table>
4.2.1 Head Office

Aviation Medicine Section  
Cnr Barry Drive & Northbourne Avenue  
CANBERRA ACT 2601  
GPO Box 1544  
CANBERRA CITY ACT 2601

4.2.2 Area Offices

<table>
<thead>
<tr>
<th>Office</th>
<th>Address</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney Basin</td>
<td>PO Box CPS Condell Park</td>
<td>(02) 97803050</td>
</tr>
<tr>
<td></td>
<td>NSW 2200</td>
<td></td>
</tr>
<tr>
<td>NT and Kimberleys</td>
<td>PO Box 41196 Casuarina</td>
<td>(08) 89432999</td>
</tr>
<tr>
<td></td>
<td>NT 0811</td>
<td></td>
</tr>
<tr>
<td>South Queensland</td>
<td>39 Navigator Place Hendra</td>
<td>(07) 3632 4051</td>
</tr>
<tr>
<td></td>
<td>Qld 4051</td>
<td></td>
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<tr>
<td>North Queensland</td>
<td>PO Box 7740 Garbutt</td>
<td>(07) 4750 2671</td>
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<td></td>
<td>QLD 4814</td>
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<tr>
<td>NSW Country Office</td>
<td>GPO Box 2005 Canberra</td>
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<tr>
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<td></td>
</tr>
<tr>
<td>Victoria Tasmania</td>
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<td>131757</td>
</tr>
<tr>
<td></td>
<td>VIC 3189</td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>PO Box 126 PBC</td>
<td>(08) 8422 2904</td>
</tr>
<tr>
<td></td>
<td>Adelaide</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SA 5950</td>
<td></td>
</tr>
<tr>
<td>West Australia</td>
<td>GPO Box 1082 CLOVERDALE</td>
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<tr>
<td></td>
<td>WA 6105</td>
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</tbody>
</table>
5. Colour Vision Testing

5.1 Locations for Colour Vision Testing

### 5.1.1 Locations by State

| Australian Capital Territory | 1. **Dr D Batagol**  
Ainslie Family Practice  
21 Edgar St  
AINSLIE ACT 2602  
Tel: (02) 6249 7177 |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| New South Wales             | 1. **School of Optometry**  
(Paula Katalinic) Rupert Meyers Blg  
University of New South Wales  
KENSINGTON NSW 2033  
Tel: (02) 9385 4624  
2. **Dr P Duke**  
135 Macquarie Street  
SYDNEY NSW 2000  
Tel: (02) 9247 3557 |
| Northern Territory          | 1. **Dr M I Mahmood**  
Darwin Private Hospital  
Rocklands Drive  
CASUARINA NT 0810  
Tel: (08) 8920 6049 |
| Queensland                  | 1. **Optometry Clinic, School Of Optometry**  
O Block Kelvin Grove Campus  
Victoria Park Road  
KELVIN GROVE QLD 4059  
Tel: (07) 3864 5739  
**Note:**  
Please specify "Aviation Colour Vision Test" when making an appointment.  
2. **Dr W Talbot**  
14 Fulham Rd  
PIMLICO TOWNSVILLE QLD 4812  
Tel: (07) 4775 1633 |
### 5. Colour Vision Testing

#### 5.1 Locations for Colour Vision Testing

<table>
<thead>
<tr>
<th>State</th>
<th>Location</th>
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<tbody>
<tr>
<td>South Australia</td>
<td><strong>1. Dr J L Crompton</strong>&lt;br&gt;22 Walter Street&lt;br&gt;NORTH ADELAIDE SA 5006&lt;br&gt;Tel: (08) 8267 3211</td>
</tr>
<tr>
<td>Tasmania</td>
<td><strong>1. Defence Forces</strong>&lt;br&gt;Recruiting Medical Section&lt;br&gt;Anglesea Barracks, Davie Street&lt;br&gt;HOBART TAS 7000&lt;br&gt;Tel: (03) 6237 7327</td>
</tr>
<tr>
<td>Victoria</td>
<td><strong>1. Visual Functions Clinic</strong>&lt;br&gt;Victorian College of Optometry&lt;br&gt;Corner Keppel and Cardigan Streets&lt;br&gt;CARLTON VIC 3053&lt;br&gt;Tel: (03) 9349 7400&lt;br&gt;&lt;br&gt;Note: Please state that an “Aviation Colour Vision Test” is required in the Visual Functions Clinic when making an appointment.&lt;br&gt;&lt;br&gt;<strong>2. Dr J Parkes</strong>&lt;br&gt;54 Station Place&lt;br&gt;SUNSHINE VIC 3020&lt;br&gt;Tel: (03) 9312 0800</td>
</tr>
<tr>
<td>Western Australia</td>
<td><strong>1. Ms Lisa Biggs</strong>&lt;br&gt;Suite G108, First Floor&lt;br&gt;Northcourt Building&lt;br&gt;200 Karrinjup Rd&lt;br&gt;KARRINYUP WA 6018&lt;br&gt;Tel: 0411 617 808&lt;br&gt;&lt;br&gt;<strong>2. Abernathy Owens Optometrists</strong>&lt;br&gt;888 Hay St&lt;br&gt;PERTH WA&lt;br&gt;Tel: (08) 9486 8855</td>
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6.1 List of Forms

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<th>New CASA Form No.</th>
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<td>Medical Questionnaire and Examination Form—O</td>
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<td>Medical Certificate</td>
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<td>Application for Appointment or Re-appointment as Designated Aviation Medical Examiner or Designated Aviation Ophthalmologist (under Regulation 6.02 of the Civil Aviation Regulations)</td>
<td>The CASA website</td>
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6. Aviation Medicine Forms
6.1 Form Details and Availability

Blank page
BODY MASS INDEX CHART

Weight For Height Chart
(For Men and Women from 18 years onward)

Based on Body Mass Index (BMI) in Range of 18, 20, 25, 30.

\[ \text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}} \]
1. Revision History
1. Revision History
## Coronary Heart Disease

### Risk Factor Prediction Chart

#### 1. Find Points for each Risk Factor

<table>
<thead>
<tr>
<th>Age (if Female)</th>
<th>Age (if Male)</th>
<th>HDL Cholesterol</th>
<th>Total Cholesterol</th>
<th>Systolic Blood Pres</th>
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<td>Age Pts</td>
<td>Age Pts</td>
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<td>52-54</td>
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<td>45-46</td>
<td>4</td>
<td>55-56</td>
<td>12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2. Sum Points for all Risk Factors

\[
\text{Age } (\ ) + \ (\text{HDL-C } (\ )) = \text{Total-C } (\ ) + \ \text{SBP } (\ ) + \ \text{Smoker } (\ ) + \ \text{Diabetes } (\ ) + \ \text{ECG-LVH } (\ ) \text{ Point Total} \\
\]

**NOTE:** Minus points subtract from total

#### 3. Look up risk corresponding to point total

<table>
<thead>
<tr>
<th>Probability (%)</th>
<th>Probability (%)</th>
<th>Probability (%)</th>
<th>Probability (%)</th>
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</thead>
<tbody>
<tr>
<td>Pts 5yrs 10yrs</td>
<td>Pts 5yrs 10yrs</td>
<td>Pts 5yrs 10yrs</td>
<td>Pts 5yrs 10yrs</td>
<td>Pts 5yrs 10yrs</td>
</tr>
<tr>
<td>&lt;1 &lt;1 &lt;2 &lt;2</td>
<td>10</td>
<td>2</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>2 1 2 1</td>
<td>11</td>
<td>3</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>3 1 2 1</td>
<td>12</td>
<td>3</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>4 1 2 1</td>
<td>13</td>
<td>3</td>
<td>8</td>
<td>22</td>
</tr>
<tr>
<td>5 1 3 1</td>
<td>14</td>
<td>4</td>
<td>9</td>
<td>23</td>
</tr>
<tr>
<td>6 1 3 1</td>
<td>15</td>
<td>5</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>7 1 4 1</td>
<td>16</td>
<td>5</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>8 2 4 1</td>
<td>17</td>
<td>6</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>9 2 5 1</td>
<td>18</td>
<td>7</td>
<td>14</td>
<td>27</td>
</tr>
</tbody>
</table>

#### 4. Compare to ave 10 year risk

Modified from Chart by the American Heart Association, April 2002
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

Published by permission of Dr. D.R. Jones from ‘Psychiatric Factors in Civil Aviation Medicine’. David R. Jones, MD, MPH. 10 January 2001. This is extracted from material provided by the FAA’s Civil Aviation Medicine Institute to its Basic Aviation Medical Examiner Course.

1. Clues that may be available before the examination begins:
   - You may know something of the reputation of the applicant in the community.
   - You may learn something from the applicant’s interaction with your office staff.

   Applicants with mental health problems may behave differently with office staff than with the examiner. Consider this if your staff points out behavioural problems or eccentricities.

2. Clues on Medical Certification form:
   - The applicant’s form contains careless or missing marks.

     Obtain the correct or missing data and ask why the mistake was made.

   - The class of certificate desired is not usual for this type of pilot.

     Find out how flying fits into the applicant’s lifestyle and plans.

   - The applicant does not live or work locally.

     Consider the type and stability of the applicant’s occupation.

     Discuss how the applicant came to pick you to do this examination.

   - Previous examinations were not completed.

     Was the applicant learning what to say or not say in order to pass?

   - Previous problems prevented certification (medical or mental health history).

   - Previous experience with health professionals was not adequately explained.

   - Pilot has had personal counselling by mental health professionals or paraprofessionals.

   - Pilot time is unusual or contains unexplained gaps.

     Ask for explanation from a high-time pilot with no date of last examination.

   - Medication history suggests significant illnesses that pilot did not note on the history questionnaire.

     Obtain an adequate history.
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

- Explanations for any medical history or findings do not make sense or seem illogical.

*Remember Jones’s Rule of Irrational Data:* If you don’t understand what a flier means, assume it’s your problem. Ask again, clearly. If the flier tries hard to explain, you try hard to understand, and you still don’t understand, it’s probably the flier’s problem. Find out what it is. Possibilities include simple misunderstandings, English as a second language, educational deficiencies, cultural differences, limited intelligence, neurological problems, or psychiatric problems.

3. **Clues obtained during the physical examination:**
   - Note anything markedly different from what you usually see in pilots: trust your instincts.
   - Assess the nature of the applicant’s motivation to fly (Jones, 1986). Err on the side of caution.
   
   *Watch for applicants who want to be fliers rather than who want to fly.* Some see themselves as alienated from others, or inept, or weak, and wish to acquire the attributes they perceive to be those of fliers: gregarious, competent, and strong.

   *Watch for applicants who want to fly in order to prove fearlessness.*

   *Watch for applicants whose only knowledge of flying is childish fantasy.*

   - Look for scars without explanation obtained by history. Palpate scalp and skull for evidence of old head injury.

   *Watch for applicants whose collection of scars reflects personal recklessness.*

   - Watch for applicants who are evasive about surgical scars or head injury scars. Ask about significant loss of consciousness or amnesia if pilot did not report the injury on the 8500-8.

   - Observe other pertinent physical factors bearing on mental status (e.g., dress, grooming conduct, alcohol on breath, needle tracks, tattoos that suggest sociopathy, slash scars on wrists, spider nevi, hepatomegaly, blood pressure, heart rate, pupils).

   - Talk with applicants before, during, and after the physical examination—inquire about home, work, education, military, or flying. Trust your judgment if you feel uneasy.
Hints for Detecting Mental Health Problems During Routine Periodic Physical Examinations

- Inquire about non-prescription medications, herbal remedies and dietary supplements.

  Such information may be aeromedically significant because of the nature of these remedies, or because of the symptoms for which the pilot feels they are necessary. Taking St. John’s Wort may indicate the presence of depressive symptoms, for instance.

4. What to do when you have finished:

- Ask enough questions to clarify troublesome issues.
- Obtain indicated medical data.
- If anything you encounter raises clinical questions about the applicant’s mental status, or even if you find yourself feeling uncomfortable without knowing exactly why, perform a brief mental status evaluation, using some or all of the items in the Formal Mental Status Examination (MSE) that follows.

  Note that some clinical MSEs, such as the Mini-Mental Status Examination, assess only the Sensorium rather than the entire mental status of a person.

- If you find anything that indicates clinical problems, consider necessary specialty consultations. Again, trust your judgment as an examiner, even if you can’t exactly define what’s wrong.

- Mention equivocal items in "Comments" section of Original or Renewal form for the record, even if you grant the certificate. Your data will be on record if the item arises in future examinations.

- If in doubt, call CASA AVMED for advice.

- If in serious doubt, defer; let CASA decide.

- As a last resort: make a “Don’t quote me” call to the medical authority.
AMSIT (Appearance, Mood, Sensorium, Intelligence, Thought) is adapted from a formulation by David Fuller, MD, as presented in R.L. Leon, MD. Psychiatric Interviewing: A Primer. Ed 2, New York; Elsevier/Science Publishing Co. 1989.

**Appearance, Behaviour, and Speech**

- **Physical Appearance**: apparent age, sex, and other identifying features. Appearance of being physically ill or in distress; and a careful description of the patient’s dress and behaviour.

- **Manner of Relating to Examiner**: placating, negativistic, seductive; motivation to work with examiner.

- **Psychomotor Activity**: increased or decreased, including jumpiness, jigging, tapping, looking at watch, etc. Is the person hyperactive or lethargic?

- **Behavioural Evidence of Emotion**: tremulousness, perspiration, tears, clinched fist, turned-down mouth wrinkled brow, etc.


- **Disturbance of Attention**: distractibility, self-absorption.

- **Speech**: description—volume, rate (pressured or slowed), clarity, spontaneity and disturbances—mutism, word salad, perseveration, echolalia, affectation, neologisms, clang speech.

**Mood and Affect**

*Note*: “Mood is to Affect as Climate is to Weather.”

- **Mood**: use adjectives: *mild* (it’s there), *moderate* (it needs treatment), or *severe* (it needs treatment today!). Consider depression, elation, or other sustained emotions such as anger, fear, or anxiety.

- **Affect**: its range, intensity, lability, and appropriateness to immediate thought. To describe a normal, stable emotional status, say something like “The examinee’s mood is euthymic. Affect is unremarkable in range, intensity, and stability, and is appropriate to material being discussed.”

**Sensorium**

- **Orientation**: for time, place and situation.

- **Memory**: *immediate* (digits recall), *recent* (three items for 10 minutes, current events) and *remote* (history).
Formal Mental Status Examination

- **Calculating Ability**: serial 7’s, 11 times 13 out loud (valid only if patient is adequately educated).
- **Concentration**: spell WORLD backwards, then arrange its letters alphabetically. Repeat with EARTH.

**Intellectual Function**

Estimate current level of function as *above average*, *average*, or *below average* based on general fund of information, vocabulary, and complexity of concepts. Do not confuse *intelligence* with *education*. Can the examinee handle abstract ideas, reason by analogy, “make the connection” in conversation? Is the examinee about as smart as the examiner?

**Thought**

- **Coherence**: clear thoughts may be expressed incoherently.
- **Logic**: even clear, grammatical speech may express illogical thoughts.
- **Goal Directedness** (has a point and makes it): tangential or circumstantial thought.
- **Disturbance of Attention**: distractibility (interrupts own sentences), self-absorption.
- **Associations**: loose associations, blocking of obvious ideas or connections, flight of ideas.
- **Perceptions**: hallucinations (false perceptions), illusions, depersonalisation, distortion of body image.
- **Delusions**: false interpretations of real situations.
- **Other Content**: noteworthy memories, thoughts and feelings; suicidal or homicidal intent.
- **Judgement**: formal (specific set-piece situations such as “mailing a letter you find on the street”), social (how examinee behaves with examiner, how he or she “reads” other people—predictable, reasonable, comfortable).
- **Abstracting Ability**: ask pilot to define similarities/differences between tree-bush, child-midget, king-president, character-personality. This is more reliable than interpreting proverbs (stitch in time, bird in the hand).
- **Insight**: understanding of any personal dysfunction affecting self or others, and its need for treatment. Insight is *lacking* if there is an unacknowledged problem, *superficial* if it is only acknowledged (“It is a problem.”), *moderate* if it is personalized (“I have a problem”), and *profound* if “It’s my problem, and it’s up to me to fix it.”
1. Revision History
Criteria for the Diagnosis of Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD)

Before a diagnosis of ADD/ADHD can be made, the following criteria (from DSM IV) must be fulfilled:

A. Either (1) or (2):

1. Six (or more) of the following symptoms of **inattention** have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
   - Often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
   - Often has difficulty sustaining attention in tasks or play activities
   - Often does not seem to listen when spoken to directly
   - Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
   - Often has difficulty organizing tasks and activities
   - Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
   - Often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
   - Is often easily distracted by extraneous stimuli
   - Is often forgetful in daily activities.

2. Six (or more) of the following symptoms of **hyperactivity-impulsivity** have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:
   - Hyperactivity
     - Often fidgets with hands or feet or squirms in seat
     - Often leaves seat in classroom or in other situations in which remaining seated is expected
     - Often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
     - Often has difficulty playing or engaging in leisure activities quietly
     - Is often "on the go" or often acts as if "driven by a motor" often talks excessively
   - Impulsivity
     - Often blurts out answers before questions have been completed
     - Often has difficulty awaiting turn
     - Often interrupts or intrudes on others (e.g. butts into conversations or games)
Criteria for the Diagnosis of Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g. at school [or work] and at home).

D. Clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g. Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

Specify Types:

- **Attention-Deficit/Hyperactivity Disorder, Combined Type**: if both Criteria A1 and A2 are met for the past 6 months.

- **Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type**: if Criterion A1 is met but Criterion A2 is not met for the past 6 months.

- **Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type**: if Criterion A2 is met but Criterion A1 is not met for the past 6 months.
# Designated Aviation Medical Examiner's Handbook

## Revision History

Approved by Assistant Director, Aviation Safety Standards  
Version 3.8: November 2010

**Note:** The Revision History shows the most recent amendment first. Scroll down the table to view details of previous amendment information.

<table>
<thead>
<tr>
<th>Version</th>
<th>Revision Date</th>
<th>Chapter/Section</th>
<th>Amendment</th>
</tr>
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<tbody>
<tr>
<td>3.8</td>
<td>11/2010</td>
<td>Table of Contents</td>
<td>Added Preface.</td>
</tr>
<tr>
<td>3.7</td>
<td>10/2010</td>
<td>Section 2.6.5</td>
<td>Added draft guidelines for Aeromedical Management Protocol in Attention Deficit Hyperactivity Disorder (ADHD).</td>
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<td>05/2010</td>
<td>Section 2.4.4</td>
<td>New Insulin Protocol.</td>
</tr>
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<td>3.6</td>
<td>11/2008</td>
<td>Section 5.1</td>
<td>Contact details updated.</td>
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<tr>
<td>3.5</td>
<td>09/2008</td>
<td>Section 2.12</td>
<td>Partly revised to eliminate Australian Hearing Services.</td>
</tr>
<tr>
<td>3.4</td>
<td>08/2008</td>
<td>Section 2.2</td>
<td>Section completely revised.</td>
</tr>
<tr>
<td>3.3</td>
<td>07/2005</td>
<td>Section 2.11</td>
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</tr>
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<td>3.2</td>
<td>01/2005</td>
<td>Section 2.9</td>
<td>Section completely revised.</td>
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<td></td>
<td></td>
<td>Section 2.14</td>
<td>Partly revised including all tables and figures.</td>
</tr>
<tr>
<td>3.1</td>
<td>01/2004</td>
<td>Chapter 5</td>
<td>Inserted Dr Parkes name and details under ‘Victoria’ (page 2).</td>
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<td></td>
<td></td>
<td>Form 755</td>
<td>Changed para xiii on page 2 and para xi on page 4.</td>
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<tr>
<td>3.0</td>
<td>12/2003</td>
<td></td>
<td>Complete re-issue</td>
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<td>11/2001</td>
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<td>2.3</td>
<td>12/2000</td>
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<td>2.0</td>
<td>05/1999</td>
<td></td>
<td>Issue of complete manual online</td>
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**Application for Aviation Medical Certificate – Declaration**

**Applicant to complete**

<table>
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<tr>
<th>I (name of applicant)</th>
<th>Date of examination</th>
<th>ARN</th>
</tr>
</thead>
</table>

- am applying for an Aviation Medical Certificate in accordance with CASR Part 67; and
- have carefully considered every question the examiner has asked me in relation to the medical certificate I am applying for and I have reviewed the answers in the Medical Questionnaire and Examination form. I have answered every question correctly and completely (see Note 1 below); and
- except as provided in CASR 67.180(5) (see Note 2 below), authorise the disclosure to CASA and the examiner of any information about me that may help CASA to decide whether I meet the relevant medical standard, being information that is held by a person, organisation, body or authority referred to in CASR 67.180(6) (see Note 3 below); and
- understand that CASA will use relevant medical information for internal audit or research (results will be de-identified), and disclose relevant medical information to another ICAO State’s civil aviation regulator if I hold, or apply for, medical certification in that State; and
- acknowledge that a fee applies to the processing and consideration of a medical certificate application and CASA may not process my application until the appropriate fee has been paid.

**Applicant’s signature**

<table>
<thead>
<tr>
<th>Date</th>
</tr>
</thead>
</table>

---

**DAME to complete**

<table>
<thead>
<tr>
<th>I (name of DAME)</th>
<th>ARN</th>
<th>Stamp number</th>
</tr>
</thead>
</table>

- am satisfied that the person who I have examined for a medical certificate is the applicant whose signature appears above; and
- for the purposes of CASR 67.170 (Evidence of Identity): (cross one only)

- I have sighted current photographic identification of the applicant. [ ]
- I know or have reason to believe that the applicant is who the applicant claims to be. [ ]

**DAME’s signature**

<table>
<thead>
<tr>
<th>Date</th>
</tr>
</thead>
</table>

---

**DAME Stamp**

---

**Note 1**

A false statement in relation to the issue of a certificate is an offence punishable by imprisonment for 12 months (see the Criminal Code section 137.1).

**Note 2**

The authorisation in paragraph 3 above does not require a person, organisation, body or authority to disclose information:
- that was collected for use as evidence in a legal proceeding, and has not been tendered or admitted as evidence in a court; or
- information that could not, because of Part 3.10 of the Evidence Act 1995, be given in evidence in a proceeding to which that Part applies. (Part 3.10 of the Evidence Act 1995 is about client legal privilege, religious confessions, self incrimination in other proceedings, and evidence excluded in the public interest – for details, see that Act.)

**Note 3: CASA 67.180(6)**

- A medical practitioner.
- Any other person or organisation (including a hospital) that has made a physical, psychological or psychiatric examination of the applicant.
- Any other person or organisation (including a hospital) that has treated the applicant for a medically significant condition.
- An employer (including a former employer) of the applicant.
- Any other person, organisation, body of authority (including a police force or police service and, subject to Part VIIC of the Crimes Act 1914, a court) that holds information of the kind referred to in paragraph 3 above.

**Privacy**

CASA is collecting the information on this form for the purpose of assessing an application by you for a medical certificate. This is required by Part 67 of the Civil Aviation Safety Regulations 1998. The form and any associated medical reports or documents are provided to CASA by a designated aviation medical examiner. The form will be stored by CASA in medical files for each ARN holder who applies for or seeks renewal of a medical certificate in a Medical Records System (MRS). The form and associated documents are accessible by officers of CASA’s Office of Aviation Medicine. The documents may be provided, when required, to other officers of CASA, such as the Legal Services Group. CASA will provide the forms and associated documents to medical specialists where a review of medical issues raised in the reports is necessary.
Medical Questionnaire and Examination Form for Revalidation of a Medical Certificate which is Current or has Lapsed for Less than Five Years

All items in section 1 and 2 must be typed. All other responses may be typed or written clearly in black pen. Please mark response boxes with an X within the confines of the box. Written comments should be confined to the 'Comments' section on page 5.

SECTION 1: Designated Aviation Medical Examiner Information

Examiner's surname

DAME identifier

Initials

Date of examination (dd/mm/yyyy)

SECTION 2: Applicant's Personal Information

Title: Mr MRS Ms Other

ARN

Date of birth (dd/mm/yyyy)

Family name

Given names

Initials

Age

Sex M F

Former name

Residential address (Mandatory requirement)

Contact phone numbers

STD After hours

STD Working hours

Suburb or town

State/Country

Postal code or overseas code

Postal address (leave blank unless different from residential)

Total flying hours (to nearest hour)

Suburb or town

Hours flown in the last six months

State/Country

Postal code or overseas code

Employer (professional aircrew only)

Date of the last Australian Civil Aviation Medical Examination (dd/mm/yyyy)

Applicant's usual Medical Practitioner and Dentist

Practitioner: Name

Town

State

Phone No.

Dentist: Name

Town

State

Phone No.
### SECTION 3: Aviation Information

Mark as required. This examination is for:

<table>
<thead>
<tr>
<th>Standard 1</th>
<th>Standard 2</th>
<th>Standard 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airline Transport Pilot</td>
<td>Private Pilot</td>
<td>Air Traffic Control Officer</td>
</tr>
<tr>
<td>Commercial Pilot</td>
<td>Student Pilot</td>
<td>Flight Service Officer</td>
</tr>
<tr>
<td>Flight Engineer/Navigator</td>
<td><strong>Other (see below)</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Which flying training organisation will be conducting the student's training?*

and, at which airfield?

Category of aircraft the applicant intends to operate:

<table>
<thead>
<tr>
<th>Powered</th>
<th>Fixed-Wing</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5700Kg MTOW</td>
<td>5700Kg - 15,000Kg MTOW</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rotary-Wing</th>
<th>&lt;2300Kg</th>
<th>2300Kg or &gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special**</td>
<td>Balloons</td>
<td>Gliders</td>
</tr>
<tr>
<td>Ultra-light and other</td>
<td>Aerobatics</td>
<td></td>
</tr>
</tbody>
</table>

Will the pilot be engaging in:

| Agricultural flying | Mustering | Command Instrument rating |

The pilot's intended operations are:

| Single-pilot | Multi-crew |

### SECTION 4: Health Questionnaire (please use black pen)

**Since the last aviation medical examination, or in the last two years, has the applicant:**

<table>
<thead>
<tr>
<th>Question</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. been admitted to a hospital or suffered from any medical condition which may affect his/her ability to exercise the privileges of his/her licence?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>2. suffered any chest or abdominal pain?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>3. suffered any pain severe enough to be disabling?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>4. coughed or vomited blood?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>5. passed blood with urine or faeces?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>6. taken any medically prescribed drugs for longer than two consecutive weeks?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>7. had any traffic or criminal convictions relating to drugs or alcohol?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>7A. EVER, or is he/she NOW using any of the following substances: opiates, cannabinoids, sedatives and hypnotics, cocaine, other psychostimulants, hallucinogens or volatile solvents?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>8. had a laboratory test for HIV infection?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>If yes, what was the result?</td>
<td>+ve</td>
<td>-ve</td>
</tr>
<tr>
<td>9. smoked tobacco in any form?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>If cigarettes, state number per day.</td>
<td>&lt;10</td>
<td>10-25</td>
</tr>
<tr>
<td>10. undertaken exercise for at least 3 times per week for 20 minutes or more?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>11. is there any significant family cardiac history?</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

CONFIDENTIAL
SECTION 5A: Medical Examination

1. Height (to nearest centimetre) \( \text{cm} \)  
Weight (to nearest kilogram) \( \text{Kg} \)  
In all cases state the Body Mass Index.  
[\( \text{BMI} = \frac{\text{weight (kg)}}{\text{height}^2 (\text{m}^2)} \)]  
Is the Body Mass Index outside the range 17.0 - 35.0? Y N

2. In all cases, state the pulse rate  
Pulse rate: mark appropriate range box  
\(<45\) \(45 - 120\) \(>120\)  
Is there any abnormality in the pulse rhythm? Y N

3. Blood pressure:  
Is the blood pressure outside of acceptable limits (160/95)? Y N  
State the blood pressure

4. Is there any abnormality in the cardiovascular system including heart sounds, peripheral vasculature and perfusion? Y N

5. Is anti-hypertensive therapy being used? Y N  
If yes, state medication and dose.

Please note, an ECG/Stress ECG is required at specific intervals for all class 1 & 3 applicants.

6. If an ECG has been performed, is it abnormal? (leave blank if no ECG performed) Y N

7. Serum lipids required for all Class 1 & 3 at ages 25 and 5 yearly intervals thereafter.  
State the readings. Total Chol. HDL Chol. LDL Chol.

8. Is the peak flow rate of FEV\(_1\) abnormal? (range is within 30% of the predicted value for height, sex and age) Y N

9. Is there any abnormality of the respiratory system, including dyspnoea, wheezing, cyanosis, decreased respiratory movements, etc.? Y N

10. In the abdomen, is there any tenderness, palpable mass or hernia? Y N

11. Is there any abnormality of the gastro-intestinal system? Y N

12. Is there any abnormality of the nervous system, including cranial nerves, muscle tone, power, sensory perception and reflexes? Y N

13. Is there any significant abnormality or limitation of movement in the musculo-skeletal system? Y N

14. Is there anything in the applicant's personality or appearance which causes concern? Y N

15. Is there any evidence of drug or alcohol abuse? Y N
## SECTION 5B: Vision

Distance Vision Standard

<table>
<thead>
<tr>
<th>Class 1 &amp; 3</th>
<th>R6/9</th>
<th>L6/9</th>
<th>B6/9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 2</td>
<td>R6/12</td>
<td>L6/12</td>
<td>B6/9</td>
</tr>
</tbody>
</table>

16. Does the applicant require visual correction for distant vision?

- Y  
- N

If yes, type of correction used:

- spectacles
- soft contact lenses
- hard or gas permeable contact lenses

17. Distance visual acuity using a standard Snellen chart at 6 metres:

**Without correction:**

<table>
<thead>
<tr>
<th>Right eye</th>
<th>6/6</th>
<th>6/6</th>
<th>6/9</th>
<th>6/12</th>
<th>worse than 6/12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left eye</td>
<td>6/6</td>
<td>6/6</td>
<td>6/9</td>
<td>6/12</td>
<td>worse than 6/12</td>
</tr>
<tr>
<td>Binocular</td>
<td>6/6</td>
<td>6/6</td>
<td>6/9</td>
<td>6/12</td>
<td>worse than 6/12</td>
</tr>
</tbody>
</table>

State visual acuity if worse than 6/12

<table>
<thead>
<tr>
<th>Right eye</th>
<th>Left eye</th>
<th>Binocular</th>
</tr>
</thead>
</table>

**With correction:**

<table>
<thead>
<tr>
<th>Right eye</th>
<th>6/6</th>
<th>6/6</th>
<th>6/9</th>
<th>6/12</th>
<th>worse than 6/12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left eye</td>
<td>6/6</td>
<td>8/6</td>
<td>6/9</td>
<td>6/12</td>
<td>worse than 6/12</td>
</tr>
<tr>
<td>Binocular</td>
<td>6/6</td>
<td>8/6</td>
<td>6/9</td>
<td>6/12</td>
<td>worse than 6/12</td>
</tr>
</tbody>
</table>

State visual acuity if worse than 6/12

<table>
<thead>
<tr>
<th>Right eye</th>
<th>Left eye</th>
<th>Binocular</th>
</tr>
</thead>
</table>

Near Vision Standard all Classes N14 at 1 metre and N5 at 30-50cmx binocularly

18. Does the applicant require visual correction for near vision?

- Y  
- N

19. Does the applicant fail to meet the near vision standard?

(If yes, elaborate in the "Examiners Comments" and refer for further vision assessment.)

- Y  
- N

20. Is there any abnormality of the optic fundus?

- Y  
- N

21. Is there any abnormality of the visual fields?

- Y  
- N

22. Is there any abnormality of the pupillary reaction to light and accommodation?

- Y  
- N

23. Is there any abnormality of the eyes and their adnexae?

- Y  
- N

24. Has ophthalmological assessment been arranged?

- Y  
- N
SECTION 5C: Hearing

25. Is there any abnormality of the auditory canals and ear drums?  Y  N
26. Does the applicant fail to hear a conversational voice at 2 metres?  Y  N

An audiogram must be sent for Class 1 and Class 3 medical certificates at initial issue.

27. Does the applicant exceed 35db loss in either ear at 0.5, 1.0 or 2.0 KHz, or 50db loss at 3.0 KHz?  Y  N

SECTION 5D: Urine

28. Does the urine test positive for protein, glucose or blood?  Y  N
29. Is the applicant diabetic?  Y  N

If yes, state the level of glycosylated haemoglobin.

SECTION 6: Assessment

1. Do you consider there are any areas of concern in the applicant's assessment which require specialist referral or counselling?  Y  N
2. Do you have any doubts that the applicant is fit to exercise the privileges of his/her licence?  Y  N
3. Has the certificate been revalidated?  Y  N
4. If a certificate was issued, were any of the following restrictions included:
   Vision correction required
   Fall colour vision screening
   Medical waiver under CAR 6.10 granted
5. Are you the applicant's General Practitioner?  Y  N

Examiner's Comments on Applicant's Health Questionnaire and Examination
DECLARATION AND SIGNATORIES

Before sending this report to Aviation Medicine, please check for inclusion of:

1. Applicant's signature
2. DAME'S number, stamp and signature
3. ECG, audiogram, ophthalmological report and serum lipids, if required
   (note: ECG trace should be mounted on the reverse side of this page)
4. Other reports, if required (please specify).

NOTE: It is an offence under the Civil Aviation Act to withhold any relevant information or to make any false or misleading statement for the purpose of obtaining a medical certificate.

DECLARATION BY APPLICANT: I hereby declare that I have carefully considered the statements made in this Medical Questionnaire and that to the best of my knowledge they are complete and correct. I am aware that medical reports required for certification may be passed to medical specialists for an opinion.

IDENTIFICATION: I, the designated aviation medical examiner, declare that I have sighted an identifying document with photograph or can personally identify the applicant.

Applicant's signature

Examiner's signature

14 JAN 2009

ECG Details and consultant cardiologist's opinion

If ECG performed by DAME, enter DAME identifier

ECG originating Doctor's surname

Date of ECG (dd/mm/yyyy)

For consultant cardiologist's use only

Is the ECG within normal limits?

Y

N

Please comment only if the ECG is outside normal limits

Consultant Cardiologist's Surname

Consultant's signature

CONFIDENTIAL
Medical Questionnaire and Examination Form for Revalidation of a Medical Certificate which is Current or has Lapsed for Less than Five Years

All items in section 1 and 2 must be typed. All other responses may be typed or written clearly in black pen. Please mark response boxes with an X within the confines of the box. Written comments should be confined to the ‘Comments’ section on page 5.

SECTION 1: Designated Aviation Medical Examiner Information

Examiner’s surname

DAME Identifier

Initials

Date of examination (dd/mm/yyyy)

SECTION 2: Applicant’s Personal Information

Title:  Mr  Mrs  Ms  Other

ARN

Family name

Date of birth (dd/mm/yyyy)

Given names

Age

Initials

Sex  M  F

Former name

Residential address
(Mandatory requirement)

Contact phone numbers

STD  After hours

STD  Working hours

Suburb or town

State/Country

Postcode or overseas code

Postal address
(leave blank unless different from residential)

Total flying hours
(to nearest hour)

Suburb or town

State/Country

Postcode or overseas code

Employer
(professional airline only)

Hours flown in the last six months

Date of the last Australian Civil Aviation Medical Examination (dd/mm/yyyy)

/App/20

Applicant’s usual Medical Practitioner and Dentist

Practitioner:

Name

Town

State

Phone No.

Dentist:

Name

Town

State

Phone No.
SECTION 3: Aviation Information

Mark as required. This examination is for:

**Standard 1**
- Airline Transport Pilot
- Commercial Pilot
- Flight Engineer/Navigator

**Standard 2**
- Private Pilot
- Student Pilot
- **Other (see below)**

**Standard 3**
- Air Traffic Control Officer
- Flight Service Officer

*Which flying training organisation will be conducting the student’s training?*

and, at which air field?

Category of aircraft the applicant intends to operate:

- Powered
  - Fixed-Wing: <5700Kg MTOW
  - Fixed-Wing: 5700Kg - 15,000Kg MTOW
  - Fixed-Wing: >15,000Kg MTOW

- Rotary-Wing: <2300Kg
- Rotary-Wing: 2300Kg or >
- Special: Balloons
- Special: Gliders
- Other (Incl. gyrocopters)
- Ultra-light and other
- Agricultural flying
- Mustering
- Aerobatics
- Command instrument rating

SECTION 4: Health Questionnaire (please use black pen)

*Since the last aviation medical examination, or in the last two years, has the applicant:

1. been admitted to a hospital or suffered from any medical condition which may affect his/her ability to exercise the privileges of his/her licence? Y N
2. suffered any chest or abdominal pain? Y N
3. suffered any pain severe enough to be disabling? Y N
4. coughed or vomited blood? Y N
5. passed blood with urine or faeces? Y N
6. taken any medically prescribed drugs for longer than two consecutive weeks? Y N
7. had any traffic or criminal convictions relating to drugs or alcohol? Y N
7A. EVER, or is he/she NOW using any of the following substances: opiates, cannabinoids, sedatives and hypnotics, cocaine, other psychostimulants, hallucinogens or volatile solvents? Y N
8. had a laboratory test for HIV infection? Y N
   If yes, what was the result? +ve -ve
9. smoked tobacco in any form? Y N
   If cigarettes, state number per day: <10 10-25 >25
10. undertaken exercise for at least 3 times per week for 20 minutes or more? Y N
11. is there any significant family cardiac history? Y N

CONFIDENTIAL
SECTION 5A: Medical Examination

1. Height (to nearest centimetre) cm  Weight (to nearest kilogram) Kg

   In all cases state the Body Mass Index.
   [BMI = weight (kg)/height\(^2\) (m\(^2\))]

   Is the Body Mass Index outside the range 17.0 - 35.0? Y N

2. In all cases, state the pulse rate

   Pulse rate: mark appropriate range box
   <45  45 - 120  >120

   Is there any abnormality in the pulse rhythm? Y N

3. Blood pressure:

   Is the blood pressure outside of acceptable limits (150/90)? Y N

   State the blood pressure

4. Is there any abnormality in the cardiovascular system including
   heart sounds, peripheral vasculature and perfusion? Y N

5. Is anti-hypertensive therapy being used? Y N

   If yes, state medication and dose.

Please note, an ECG/Stress ECG is required at specific intervals for all class 1 & 3 applicants.

6. If an ECG has been performed, is it abnormal? (leave blank if no ECG performed) Y N

7. Serum lipids required for all Class 1 & 3 at ages 25 and 5 yearly intervals thereafter.

   State the readings. Total Chol. HDL Chol. LDL Chol.

8. Is the peak flow rate of FEV\(_1\) abnormal? (range is within 30% of the predicted value for height, sex and age) Y N

9. Is there any abnormality of the respiratory system, including dyspnoea, wheezing, cyanosis, decreased respiratory movements, etc.? Y N

10. In the abdomen, is there any tenderness, palpable mass or hernia? Y N

11. Is there any abnormality of the gastro-intestinal system? Y N

12. Is there any abnormality of the nervous system, including cranial nerves, muscle tone, power, sensory perception and reflexes? Y N

13. Is there any significant abnormality or limitation of movement in the musculo-skeletal system? Y N

14. Is there anything in the applicant’s personality or appearance which causes concern? Y N

15. Is there any evidence of drug or alcohol abuse? Y N
SECTION 5B: Vision

Distance Vision Standard

<table>
<thead>
<tr>
<th>Class 1 &amp; 3</th>
<th>R0/9</th>
<th>L0/9</th>
<th>B0/6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 2</td>
<td>R0/12</td>
<td>L0/12</td>
<td>B0/9</td>
</tr>
</tbody>
</table>

16. Does the applicant require visual correction for distant vision?  
   If yes, type of correction used:
   - spectacles
   - soft contact lenses
   - hard or gas permeable contact lenses

17. Distance visual acuity using a standard Snellen chart at 6 metres:

   Without correction:
   - Right eye: 6/5, 6/6, 6/9, 6/12, worse than 6/12
   - Left eye: 6/5, 6/6, 6/9, 6/12, worse than 6/12
   - Binocular: 6/5, 6/6, 6/9, 6/12, worse than 6/12

   State visual acuity if worse than 6/12
   - Right eye
   - Left eye
   - Binocular

   With correction:
   - Right eye: 6/5, 6/6, 6/9, 6/12, worse than 6/12
   - Left eye: 6/5, 6/6, 6/9, 6/12, worse than 6/12
   - Binocular: 6/5, 6/6, 6/9, 6/12, worse than 6/12

   State visual acuity if worse than 6/12
   - Right eye
   - Left eye
   - Binocular

Near Vision Standard all Classes N14 at 1 metre and N5 at 30-50cms binocularly

18. Does the applicant require visual correction for near vision?  
   Y  N

19. Does the applicant fail to meet the near vision standard?  
   (If yes, elaborate in the "Examiners Comments" and refer for further vision assessment.)  
   Y  N

20. Is there any abnormality of the optic fundi?  
   Y  N

21. Is there any abnormality of the visual fields?  
   Y  N

22. Is there any abnormality of the pupillary reaction to light and accommodation?  
   Y  N

23. Is there any abnormality of the eyes and their adnexae?  
   Y  N

24. Has ophthalmological assessment been arranged?  
   Y  N

CONFIDENTIAL
SECTION 5C: Hearing

25. Is there any abnormality of the auditory canals and ear drums? Y N

26. Does the applicant fail to hear a conversational voice at 2 metres? Y N

An audiogram must be sent for Class 1 and Class 3 medical certificates at initial issue.

27. Does the applicant exceed 35db loss in either ear at 0.5, 1.0 or 2.0 KHz, or 50db loss at 3.0 KHz? Y N

SECTION 5D: Urine

28. Does the urine test positive for protein, glucose or blood? Y N

29. Is the applicant diabetic? Y N

If yes, state the level of glycosylated haemoglobin.

SECTION 6: Assessment

1. Do you consider there are any areas of concern in the applicant’s assessment which require specialist referral or counselling? Y N

2. Do you have any doubts that the applicant is fit to exercise the privileges of his/her licence? Y N

3. Has the validity period of the medical certificate been extended in accordance with CASR 67.220 or has a new certificate been issued in accordance with CASR 67.225? Y N

4. Are you the applicant’s General Practitioner? Y N

Examiner’s Comments on Applicant’s Health Questionnaire and Examination

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

CONFIDENTIAL
DECLARATION AND SIGNATORIES

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2. DAME'S number, stamp and signature
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   (note: ECG trace should be mounted on the reverse side of this page)
4. Other reports, if required (please specify).

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DECLARATION BY APPLICANT: I hereby declare that I have carefully considered the statements made in this Medical Questionnaire and that to the best of my knowledge they are complete and correct. I am aware that medical reports required for certification may be passed to medical specialists for an opinion.

IDENTIFICATION: I, the designated aviation medical examiner, declare that I have sighted an identifying document with a photograph or can personally identify the applicant.

Applicant's signature

Examiner's signature

06 JAN 2006

06 JUN 2006

ECG Details and consultant cardiologist's opinion

If ECG performed by DAME, enter DAME Identifier

ECG originating Doctor's surname

Date of ECG

06 JUN 2006

For consultant cardiologist's use only

Is the ECG within normal limits?

Y

N

Please comment only if the ECG is outside normal limits

Consultant Cardiologist's Surname

Consultant's signature

(dd/mm/yyyy)

CONFIDENTIAL
Medical Questionnaire and Examination Form for Revalidating a Medical Certificate which is Current or has Lapsed for Less than Five Years
All items in section 1 and 2 must be typed. All other responses may be typed or written clearly in black pen. Please mark response boxes with an X within the confines of the box. Written comments should be confined to the Comments section on page 8.

Important Note: A fee applies for the processing and consideration of an application for a medical certificate. CASA cannot process your application or issue the certificate until the fee is paid.

SECTION 1: Designated Aviation Medical Examiner Information

Examiner's surname

DAME Identifier

Date of examination (dd/mm/yyyy) / /20

SECTION 2: Applicant's Personal Information

Title: Mr Mrs Ms Other

Family name

Given names

Initials

Former name

Residential address (Mandatory requirement)

Suburb or town

State/Country

Postcode or overseas code

Postal address (leave blank unless different from residential)

Suburb or town

State/Country

Postcode or overseas code

Employer (professional aircrew only)

Date of the last Australian Civil Aviation Medical Examination (dd/mm/yyyy) / /20

Applicants usual Medical Practitioner and Dentist

Practitioner: Name

Town

State

Phone No.

Dentist: Name

Town

State

Phone No.
SECTION 3: Aviation Information

Mark as required. This examination is for:

<table>
<thead>
<tr>
<th>Standard 1</th>
<th>Standard 2</th>
<th>Standard 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airline Transport Pilot</td>
<td>Private Pilot</td>
<td>Air Traffic Control Officer</td>
</tr>
<tr>
<td>Commercial Pilot</td>
<td>*Student Pilot</td>
<td>Flight Service Officer</td>
</tr>
<tr>
<td>Flight Engineer/Navigator</td>
<td>**Other (see below)</td>
<td></td>
</tr>
</tbody>
</table>

*Which flying training organisation will be conducting the student’s training?*

and, at which airfield?

<table>
<thead>
<tr>
<th>Category of aircraft the applicant intends to operate:</th>
<th>Powered</th>
<th>Fixed-Wing</th>
<th>Rotary-Wing</th>
<th>Special*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;5700Kg MTOW</td>
<td>5700Kg - 15,000Kg MTOW</td>
<td>&lt;2300Kg</td>
<td>Balloons</td>
</tr>
<tr>
<td></td>
<td>&gt;15,000Kg MTOW</td>
<td>Other (incl. gyrocopters)</td>
<td>2300Kg or &gt;</td>
<td>Gliders</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ultra-light and other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Will the pilot be engaging in:**

- Agricultural flying
- Mustering
- Aerobatics
- Multi-crew
- Command Instrument rating

SECTION 4: Health Questionnaire (please use black pen)

*Since the last aviation medical examination, or in the last two years, has the applicant:*

1. been admitted to a hospital or suffered from any medical condition which may affect his/her ability to exercise the privileges of his/her licence?  
   - Y  
   - N

2. suffered any chest or abdominal pain?  
   - Y  
   - N

3. suffered any pain severe enough to be disabling?  
   - Y  
   - N

4. coughed or vomited blood?  
   - Y  
   - N

5. passed blood with urine or faeces?  
   - Y  
   - N

6. taken any medically prescribed drugs for longer than two consecutive weeks?  
   - Y  
   - N

7. had any traffic or criminal convictions relating to drugs or alcohol?  
   - Y  
   - N

7A. EVER, or is he/she NOW using any of the following substances: opiates, cannabinoids, sedatives and hypnotics, cocaine, other psychostimulants, hallucinogens or volatile solvents?  
   - Y  
   - N

8. had a laboratory test for HIV infection?  
   - If yes, what was the result?  
     - +ve  
     - -ve

9. smoked tobacco in any form?  
   - If cigarettes, state number per day.  
     - <10  
     - 10-25  
     - >25

10. undertaken exercise for at least 3 times per week for 20 minutes or more?  
    - Y  
    - N

11. is there any significant family cardiac history?  
    - Y  
    - N

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## SECTION 5A: Medical Examination

1. **Height (to nearest centimetre)** cm  **Weight (to nearest kilogram)** Kg
   - In all cases state the Body Mass Index. 
     \[ BMI = \frac{weight\ (kg)}{height^2\ (m^2)} \]
   - Is the Body Mass Index outside the range 17.0 - 35.0? **Y**  **N**

2. **In all cases, state the pulse rate**
   - Pulse rate: mark appropriate range box  
     - <45  
     - 45 - 120  **x**  
     - >120
   - Is there any abnormality in the pulse rhythm? **Y**  **N**

3. **Blood pressure:**
   - Is the blood pressure outside of acceptable limits (150/90)? **Y**  **N**
   - State the blood pressure

4. **Is there any abnormality in the cardiovascular system including heart sounds, peripheral vasculature and perfusion?** **Y**  **N**

5. **Is anti-hypertensive therapy being used?** **Y**  **N**
   - If yes, state medication and dose.

*Please note, an ECG/Stress ECG is required at specific intervals for all class 1 & 3 applicants.*

6. **If an ECG has been performed, is it abnormal?** (leave blank if no ECG performed) **Y**  **N**

7. **Serum lipids required for all Class 1 & 3 at ages 25 and 5 yearly intervals thereafter.**
   - State the readings.  
     - Total Chol.  
     - HDL Chol.  
     - LDL Chol.

8. **Is the peak flow rate of FEV₁ abnormal?** (range is within 30% of the predicted value for height, sex and age) **Y**  **N**

9. **Is there any abnormality of the respiratory system, including dyspnoea, wheezing, cyanosis, decreased respiratory movements, etc.?** **Y**  **N**

10. **In the abdomen, is there any tenderness, palpable mass or hernia?** **Y**  **N**

11. **Is there any abnormality of the gastro-intestinal system?** **Y**  **N**

12. **Is there any abnormality of the nervous system, including cranial nerves, muscle tone, power, sensory perception and reflexes?** **Y**  **N**

13. **Is there any significant abnormality or limitation of movement in the musculo-skeletal system?** **Y**  **N**

14. **Is there anything in the applicant's personality or appearance which causes concern?** **Y**  **N**

15. **Is there any evidence of drug or alcohol abuse?** **Y**  **N**

CONFIDENTIAL
SECTION 5B: Vision

Distance Vision Standard

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Class 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. Does the applicant require visual correction for distant vision?
   Y N
   If yes, type of correction used:
   - spectacles
   - soft contact lenses
   - hard or gas permeable contact lenses

17. Distance visual acuity using a standard Snellen chart at 6 metres:

   Without correction:
   - Right eye: 6/5 6/6 x 6/9 6/12 worse than 6/12
   - Left eye: 6/5 6/6 x 6/9 6/12 worse than 6/12
   - Binocular: 6/5 6/6 x 6/9 6/12 worse than 6/12
   State visual acuity if worse than 6/12
   - Right eye
   - Left eye
   - Binocular

   With correction:
   - Right eye: 6/5 6/6 6/9 6/12 worse than 6/12
   - Left eye: 6/5 6/6 6/9 6/12 worse than 6/12
   - Binocular: 6/5 6/6 6/9 6/12 worse than 6/12
   State visual acuity if worse than 6/12
   - Right eye
   - Left eye
   - Binocular

Near Vision Standard all Classes N14 at 1 metre and N5 at 30-50cms binocularly

18. Does the applicant require visual correction for near vision?  Y N
19. Does the applicant fail to meet the near vision standard?
   (If yes, elaborate in the "Examiners Comments" and refer for further vision assessment.)  Y N

20. Is there any abnormality of the optic fundus?  Y N
21. Is there any abnormality of the visual fields?  Y N
22. Is there any abnormality of the pupillary reaction to light and accommodation?  Y N
23. Is there any abnormality of the eyes and their adnexae?  Y N
24. Has ophthalmological assessment been arranged?  Y N
SECTION 5C: Hearing

25. Is there any abnormality of the auditory canals and ear drums? Y  N

26. Does the applicant fail to hear a conversational voice at 2 metres? Y  N

   An audiogram must be sent for Class 1 and Class 3 medical certificatees at initial issue.

27. Does the applicant exceed 35db loss in either ear at 0.5, 1.0 or 2.0 KHz, or 50db loss at 3.0 KHz? Y  N

SECTION 5D: Urine

28. Does the urine test positive for protein, glucose or blood? Y  N

29. Is the applicant diabetic? Y  N

   If yes, state the level of glycosylated haemoglobin.

SECTION 6: Assessment

1. Do you consider there are any areas of concern in the applicant's assessment which require specialist referral or counselling? Y  N

2. Do you have any doubts that the applicant is fit to exercise the privileges of his/her licence? Y  N

3. Has the validity period of the medical certificate been extended in accordance with CASR 67.220 or has a new certificate been issued in accordance with CASR 67.225? Y  N

4. Are you the applicant's General Practitioner? Y  N

Examiner's Comments on Applicant's Health Questionnaire and Examination

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

CONFIDENTIAL
DECLARATION AND SIGNATORIES

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1. Applicant's signature
2. DAME'S number, stamp and signature
3. ECG, audiogram, ophthalmological report and serum lipids, if required
   (note: ECG trace should be mounted on the reverse side of this page)
4. Other reports, if required (please specify).

NOTE: It is an offence under the Civil Aviation Act to withhold any relevant information or to make any false or misleading statement for the purpose of obtaining a medical certificate.

DECLARATION BY APPLICANT: I hereby declare that I have carefully considered the statements made in this Medical Questionnaire and that to the best of my knowledge they are complete and correct. I acknowledge that medical reports required by CASA for certification may be provided to medical practitioners or specialists external to CASA and/or within CASA for their comment and review. I acknowledge that a fee applies to the processing and consideration of an application for a medical certificate and CASA cannot process my application or issue a medical certificate until a fee has been paid.

IDENTIFICATION: I, the designated aviation medical examiner, declare that I have sighted an identifying document with photograph or can personally identify the applicant.

Applicant's signature

Examiner's signature

DAME STAMP

ECG Details and consultant cardiologist's opinion

If ECG performed by DAME, enter DAME identifier

Dame identifier

ECG originating Doctor's surname

If not a DAME

Date of ECG (dd/mm/yyyy)

For consultant cardiologist's use only

Is the ECG within normal limits? Y N

Please comment only if the ECG is outside normal limits

Consultant Cardiologist's Surname

(If ECG assessed by cardiac specialist)

Consultant's signature (dd/mm/yyyy)
# Australian Government

**Civil Aviation Safety Authority**

**Medical Questionnaire and Examination Form for Revalidation of a Medical Certificate which is Current or has Lapsed for Less than Five Years**

All items in section 1 and 2 must be typed. All other responses may be typed or written clearly in black pen. Please mark response boxes with an X within the confines of the box. Written comments should be confined to the 'Comments' section on page 5.

**Important Notes:** A fee applies for the processing and consideration of an application for a medical certificate. DASA cannot provide new applicants or issue the certificate until the fee is paid.

## SECTION 1: Designated Aviation Medical Examiner Information

<table>
<thead>
<tr>
<th>Examiners' surname</th>
<th>Initials</th>
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<tbody>
<tr>
<td>DAME Identifier</td>
<td></td>
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</table>

## SECTION 2: Applicant's Personal Information

<table>
<thead>
<tr>
<th>Title:</th>
<th>Mr</th>
<th>Mrs</th>
<th>Ms</th>
<th>Other</th>
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<tr>
<td>Family name</td>
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<td>Former name</td>
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<td>Postcode or overseas code</td>
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<tr>
<td>Postal address (leave blank unless different from residential)</td>
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<tr>
<td>Suburb or town</td>
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<tr>
<td>State/Country</td>
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<tr>
<td>Postcode or overseas code</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| ARN | Date of birth (dd/mm/yyyy) | Age | Sex | Contact phone numbers | STD | After hours |

| STD | Working hours | Total flying hours (to nearest hour) | Hours flown in the last six months |

| Date of the last Australian Civil Aviation Medical Examination (dd/mm/yyyy) | / |

## Applicants usual Medical Practitioner and Dentist

<table>
<thead>
<tr>
<th>Practitioner:</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Town State Phone No.</td>
</tr>
<tr>
<td>Dentist:</td>
<td>Name</td>
</tr>
<tr>
<td></td>
<td>Town State Phone No.</td>
</tr>
</tbody>
</table>

**CONFIDENTIAL**
SECTION 3: Aviation Information

Mark as required. This examination is for:

**Standard 1**
- Airline Transport Pilot
- Commercial Pilot
- Flight Engineer/Navigator

**Standard 2**
- Private Pilot

**Standard 3**
- Air Traffic Control Officer
- Flight Service Officer

*Which flying training organization will be conducting the student's training?*

**Other (see below)***

and, at which field?

Category of aircraft the applicant intends to operate:

<table>
<thead>
<tr>
<th>Powered</th>
<th>Fixed-Wing</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5700Kg M/TOW</td>
<td>5700Kg - 15,000Kg M/TOW</td>
</tr>
<tr>
<td>&gt;15,000Kg M/TOW</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rotary-Wing</th>
<th>Other (incl. gyrocopters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2300Kg</td>
<td>2300Kg or &gt;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Special**</th>
<th>Ultra-light and other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balloons</td>
<td>Gliders</td>
</tr>
</tbody>
</table>

Will the pilot be engaging in:

- Agricultural flying
- Mustering
- Aerobatics

The pilot's intended operations are:

- Single-ilot

- Multi-ilot

- Command Instrument rating

SECTION 4: Health Questionnaire (please use black pen)

Since the last aviation medical examination, or in the last two years, has the applicant:

1. been admitted to a hospital or suffered from any medical condition which may affect his/her ability to exercise the privileges of his/her licence?  
   **Y**  **N**

2. suffered any chest or abdominal pain?  
   **Y**  **N**

3. suffered any pain severe enough to be disabling?  
   **Y**  **N**

4. coughed or vomited blood?  
   **Y**  **N**

5. passed blood with urine or faeces?  
   **Y**  **N**

6. taken any medically prescribed drugs for longer than two consecutive weeks?  
   **Y**  **N**

7. had any traffic or criminal convictions relating to drugs or alcohol?  
   **Y**  **N**

7A. EVER, or is he/she NOW using any of the following substances: opiates, cannabinoids, sedatives and hypnotics, cocaine, other psychostimulants, hallucinogens or volatile solvents?  
   **Y**  **N**

8. had a laboratory test for HIV infection?  
   **Y**  **N**

   If yes, what was the result?  
   **+ve**  **-ve**

9. smoked tobacco in any form?  
   **Y**  **N**

   If cigarettes, state number per day.  
   **<10**  **10-25**  **>25**

10. undertaken exercise for at least 3 times per week for 20 minutes or more?  
    **Y**  **N**

11. Is there any significant family cardiac history?  
    **Y**  **N**

CONFIDENTIAL
**SECTION 5A: Medical Examination**

1. **Height (to nearest centimetre) cm**
   - In all cases state the Body Mass Index (BMI = weight (kg)/height\(^2\) (m\(^2\))
   - Is the Body Mass Index outside the range 17.0 - 35.0? Y N

2. **Weight (to nearest kilogram) Kg**
   - In all cases, state the pulse rate
   - Pulse rate: mark appropriate range box
     - <45
     - 45 - 120
     - >120
   - Is there any abnormality in the pulse rhythm? Y N

3. **Blood pressure:**
   - Is the blood pressure outside of acceptable limits (150/90)? Y N
   - State the blood pressure

4. **Is there any abnormality in the cardiovascular system including heart sounds, peripheral vasculature and perfusion?** Y N

5. **Is anti-hypertensive therapy being used?** Y N
   - If yes, state medication and dose.

Please note, an ECG/Stress ECG is required at specific intervals for all class 1 & 3 applicants.

6. **If an ECG has been performed, is it abnormal? (leave blank if no ECG performed)** Y N

7. **Serum lipids required for all Class 1 & 3 at ages 25 and 5 yearly intervals thereafter.**
   - State the readings.
   - Total Chol. HDL Chol. LDL Chol.

8. **Is the peak flow rate of FEV\(_1\) abnormal? (range is within 30% of the predicted value for height, sex and age)** Y N

9. **Is there any abnormality of the respiratory system, including dyspnoea, wheezing, cyanosis, decreased respiratory movements, etc.?** Y N

10. **In the abdomen, is there any tenderness, palpable mass or hernia?** Y N

11. **Is there any abnormality of the gastro-intestinal system?** Y N

12. **Is there any abnormality of the nervous system, including cranial nerves, muscle tone, power, sensory perception and reflexes?** Y N

13. **Is there any significant abnormality or limitation of movement in the musculo-skeletal system?** Y N

14. **Is there anything in the applicant's personality or appearance which cause concern?** Y N

15. **Is there any evidence of drug or alcohol abuse?** Y N

**CONFIDENTIAL**
**SECTION 5B: Vision**

<table>
<thead>
<tr>
<th>Distance Vision Standard</th>
<th>Class 1 &amp; 3 R0/9</th>
<th>L2/9</th>
<th>B0/5</th>
<th>Class 2</th>
<th>R0/12</th>
<th>L3/12</th>
<th>B0/9</th>
</tr>
</thead>
</table>

16. Does the applicant require visual correction for distant vision?  
   If yes, type of correction used:  
   - **spectacles**  
   - **soft contact lenses**  
   - **hard or gas permeable contact lenses**

17. Distance visual acuity using a standard Snellen chart at 6 metres:  
   **Without correction:**  
   - **Right eye**: 6/5, 6/6, 6/9, 6/12 worse than 6/12  
   - **Left eye**: 6/5, 6/6, 6/9, 6/12 worse than 6/12  
   - **Binocular**: 6/5, 6/6, 6/9, 6/12 worse than 6/12  
   **State visual acuity if worse than 6/12**  
   - **Right eye**  
   - **Left eye**  
   - **Binocular**

   **With correction:**  
   - **Right eye**: 8/5, 6/6, 6/9, 6/12 worse than 6/12  
   - **Left eye**: 8/5, 6/6, 6/9, 6/12 worse than 6/12  
   - **Binocular**: 8/5, 6/6, 6/9, 6/12 worse than 6/12  
   **State visual acuity if worse than 6/12**  
   - **Right eye**  
   - **Left eye**  
   - **Binocular**

**Near Vision Standard all Classes H14 at 1 metre and N5 at 30-50cms binocularly**

18. Does the applicant require visual correction for near vision?  
19. Does the applicant fail to meet the near vision standard?  
   *(If yes, elaborate in the "Examiners Comments" and refer for further vision assessment.)*

20. Is there any abnormality of the optic fundi?  
21. Is there any abnormality of the visual fields?  
22. Is there any abnormality of the pupillary reaction to light and accommodation?  
23. Is there any abnormality of the eyes and their adnexae?  
24. Has ophthalmological assessment been arranged?
SECTION 5C: Hearing

25. Is there any abnormality of the auditory canals and ear drums?  
   Y   N

26. Does the applicant fail to hear a conversational voice at 2 metres?  
   Y   N

   An audiogram must be sent for Class 1 and Class 3 medical certificates at initial issue.

27. Does the applicant exceed 35db loss in either ear at 0.5, 1.0 or 2.0 KHz,  
    or 50db loss at 3.0 KHz?  
   Y   N

SECTION 5D: Urine

28. Does the urine test positive for protein, glucose or blood?  
   Y   N

29. Is the applicant diabetic?  
   Y   N

   If yes, state the level of glycosylated haemoglobin.

SECTION 6: Assessment

1. Do you consider there are any areas of concern in the applicant's  
   assessment which require specialist referral or counselling?  
   Y   N

2. Do you have any doubts that the applicant is fit to exercise the privileges  
   of his/her licence?  
   Y   N

3. Has the validity period of the medical certificate been extended in accordance with  
   CASR 67.220 or has a new certificate been issued in accordance with CASR 67.225?  
   Y   N

4. Are you the applicant's General Practitioner?  
   Y   N

Examiner's Comments on Applicant's Health Questionnaire and Examination

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

CONFIDENTIAL
DECLARATION AND SIGNATORIES
CASA is collecting the information on this form for the purpose of assessing an application by you for a medical certificate. This is required by Part 67 of the Civil Aviation Safety Regulations 1998. The form and any associated medical reports or documents are provided to CASA by designated aviation medical examiners. The form will be stored by CASA in medical files for each ARN holder who applies for or seeks renewal of medical certificate in a Medical Records System (MRS). The form and associated documents are accessible by officers CASA’s Office of Aviation Medicine. The documents may be provided, when required, to other officers of CASA, such as the Legal Services Group. CASA will provide the forms and associated documents to medical specialists where a review of medical issues raised in the reports is necessary.

Before sending this report to Aviation Medicine, please check for inclusion of:
1. Applicant’s signature  2. DAME’S number, stamp and signature  3. ECG, audiogram, ophthalmological report and serum lipids, if required (note: ECG trace should be mounted on the reverse side of this page)  4. Other reports, if required (please specify).

NOTE: It is an offence under the Civil Aviation Act to withhold any relevant information or to make any false or misleading statement for the purpose of obtaining a medical certificate.

DECLARATION BY APPLICANT: I hereby declare that I have carefully considered the statements made in this Medical Questionnaire and that to the best of my knowledge they are complete and correct. I acknowledge that medical reports required by CASA for certification may be provided to medical practitioners or specialists external to CASA and/or within CASA for their comment and review. I acknowledge that a fee applies to the processing and consideration of an application for a medical certificate and CASA cannot process my application or issue a medical certificate until a fee has been paid.

IDENTIFICATION: I, the designated aviation medical examiner, declare that I have sighted an identifying document with photograph or can personally identify the applicant.

[Signature]
Examiner’s signature

ECG Details and consultant cardiologist’s opinion

If ECG performed by DAME, enter DAME Identifier

DAME Identifier

ECG originating Doctor’s surname
If not a DAME

ECG originating Doctor’s surname

Date of ECG
(dd/mm/yyyy)

For consultant cardiologist’s use only

Is the ECG within normal limits?

Y  N

Please comment only if the ECG is outside normal limits

[Signature]
Consultant Cardiologist’s signature

(If ECG assessed by cardiologist/specialist)

Consultant’s signature

(dd/mm/yyyy)

CONFIDENTIAL
## Australian Government
Civil Aviation Safety Authority

Medical Questionnaire and Examination Form for Revalidation of a Medical Certificate which Is Current or has Lapsed for Less Than Five Years

All items in section 1 and 2 must be typed. All other responses may be typed or written clearly in black pen. Please mark response boxes with an X where the content of the box. Written comments should be given in the 'Comments' section on page 5.

Important Note: A fee applies for processing and consideration of an application for a medical certificate. CASA cannot process your application until the fee is paid...

### SECTION 1: Designated Aviation Medical Examiner Information

<table>
<thead>
<tr>
<th>Examiners surname</th>
<th>Initials</th>
<th>Date of examination (dd/mm/yy)</th>
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| DAME Identifier | /20 |

### SECTION 2: Applicant's Personal Information

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<thead>
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<th>Mrs</th>
<th>Ms</th>
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<th>Postal address (leave blank unless different from residential)</th>
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<tr>
<th>Suburb or town</th>
<th>State/Country</th>
<th>Postcode or overseas code</th>
<th>Employer (professional aircrew only)</th>
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<table>
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<tr>
<th>Date of the last Australian Civil Aviation Medical Examination (dd/mm/yyyy)</th>
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### Applicants usual Medical Practitioner and Dentist

<table>
<thead>
<tr>
<th>Practitioner: Name</th>
<th>Town</th>
<th>State</th>
<th>Phone No.</th>
</tr>
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<table>
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<tr>
<th>Dentist: Name</th>
<th>Town</th>
<th>State</th>
<th>Phone No.</th>
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</thead>
</table>

CONFIDENTIAL
SECTION 3: Aviation Information

Mark as required. This examination is for:

**Standard 1**
- Airline Transport Pilot
- Commercial Pilot
- Flight Engineer/Navigator

**Standard 2**
- Private Pilot
- *Student Pilot

**Standard 3**
- Air Traffic Control Officer
- Flight Service Officer

*Which flying training organisation will be conducting the student’s training?

and, at which airfield?

Category of aircraft the applicant intends to operate:

**Powered Fixed-Wing**
- **<5700Kg MTOW**
- **5700Kg - 15,000Kg MTOW**
- **>15,000Kg MTOW**

**Rotary-Wing**
- **<2300Kg**
- **2300Kg or >**

**Special**
- Balloons
- Gliders

Will the pilot be engaging in:
- **Agricultural flying**
- **Mustering**
- **Aerobatics**

The pilot’s intended operations are:
- Single-pilot
- Multi-crew
- Command Instrument rating

SECTION 4: Health Questionnaire (please use black pen)

Since the last aviation medical examination, or in the last two years, has the applicant:

1. been admitted to a hospital or suffered from any medical condition which may affect his/her ability to exercise the privileges of his/her licence? Y N
2. suffered any chest or abdominal pain? Y N
3. suffered any pain severe enough to be disabling? Y N
4. coughed or vomited blood? Y N
5. passed blood with urine or faeces? Y N
6. taken any medically prescribed drugs for longer than two consecutive weeks? Y N
7. had any traffic or criminal convictions relating to drugs or alcohol? Y N
7A. EVER, or is he/she now using any of the following substances: opiates, cannabinoids, sedatives and hypnotics, cocaine, other psychostimulants, hallucinogens or volatile solvents? Y N
8. had a laboratory test for HIV infection? Y N
   If yes, what was the result? +ve -ve
9. smoked tobacco in any form? Y N
   if cigarettes, state number per day. <10 10-25 >25
10. undertaken exercise for at least 3 times per week for 20 minutes or more? Y N
11. is there any significant family cardiac history? Y N

CONFIDENTIAL
**SECTION 5A: Medical Examination**

1. **Height (to nearest centimetre)**
   - cm

2. **Weight (to nearest kilogram)**
   - Kg

3. In all cases state the Body Mass Index.
   - \[ \text{BMI} = \text{weight (kg)} / \text{height}^2 \ (\text{m}^2) \]

4. Is the Body Mass Index outside the range 17.0 - 35.0?
   - Y N

5. In all cases, state the pulse rate

<table>
<thead>
<tr>
<th>Pulse rate: mark appropriate range box</th>
<th>&lt;45</th>
<th>45 - 120</th>
<th>&gt;120</th>
</tr>
</thead>
</table>

6. Is there any abnormality in the pulse rhythm?
   - Y N

7. Blood pressure:
   - Is the blood pressure outside of acceptable limits (150/90)?
     - Y N
   - State the blood pressure

8. Is there any abnormality in the cardiovascular system including heart sounds, peripheral vasculature and perfusion?
   - Y N

9. Is anti-hypertensive therapy being used?
   - Y N
   - If yes, state medication and dosage.

Please note, an ECG/Stress ECG is required at specific intervals for all class 1 & 3 applicants.

10. If an ECG has been performed, is it abnormal? (leave blank if no ECG performed)
    - Y N

11. Serum lipids required for all Class 1 & 3 at ages 25 and 5 yearly intervals thereafter.
    - State the readings.
      - Total Chol.
      - HDL Chol.
      - LDL Chol.

12. Is the peak flow rate of FEV₁ abnormal?
    - Y N
    - (range is within 50% of the predicted value for height, sex and age)

13. Is there any abnormality of the respiratory system, including dyspnoea, wheezing, cyanosis, decreased respiratory movements, etc.?
    - Y N

14. In the abdomen, is there any tenderness, palpable mass or hernia?
    - Y N

15. Is there any abnormality of the gastro-intestinal system?
    - Y N

16. Is there any abnormality of the nervous system, including cranial nerves, muscle tone, power, sensory perception and reflexes?
    - Y N

17. Is there any significant abnormality or limitation of movement in the musculo-skeletal system?
    - Y N

18. Is there anything in the applicant's personality or appearance which causes concern?
    - Y N

19. Is there any evidence of drug or alcohol abuse?
    - Y N

CONFIDENTIAL
### SECTION 5B: Vision

#### Distance Vision Standard

<table>
<thead>
<tr>
<th>Class 1 &amp; 3</th>
<th>R6/9</th>
<th>L6/9</th>
<th>B6/6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 2</td>
<td>R6/12</td>
<td>L6/12</td>
<td>B6/9</td>
</tr>
</tbody>
</table>

16. Does the applicant require visual correction for distant vision?  
   If yes, type of correction used:
   - spectacles
   - soft contact lenses
   - hard or gas permeable contact lenses

17. Distance visual acuity using a standard Snellen chart at 6 metres:

   **Without correction:**
   - Right eye: 6/5
   - Left eye: 6/5
   - Binocular: 6/6
   
   State visual acuity if worse than 6/12
   - Right eye
   - Left eye
   - Binocular

   **With correction:**
   - Right eye: 6/5
   - Left eye: 6/5
   - Binocular: 6/5
   
   State visual acuity if worse than 6/12
   - Right eye
   - Left eye
   - Binocular

#### Near Vision Standard all Classes N14 at 1 metre and N5 at 30-50cms binocularly

18. Does the applicant require visual correction for near vision?  
19. Does the applicant fail to meet the near vision standard?  
   (If yes, elaborate in the "Examiners Comments" and refer for further vision assessment.)

20. Is there any abnormality of the optic fundi?  
21. Is there any abnormality of the visual fields?  
22. Is there any abnormality of the pupillary reaction to light and accommodation?  
23. Is there any abnormality of the eyes and their adnexae?  
24. Has ophthalmological assessment been arranged?
SECTION 5C: Hearing

25. Is there any abnormality of the auditory canals and ear drums? Y N

26. Does the applicant fail to hear a conversational voice at 2 metres? Y N

An audiogram must be sent for Class 1 and Class 3 medical certificates at initial issue.

27. Does the applicant exceed 35db loss in either ear at 0.5, 1.0 or 2.0 KHz, or 50db loss at 3.0 KHz? Y N

SECTION 5D: Urine

28. Does the urine test positive for protein, glucose or blood? Y N

29. Is the applicant diabetic? Y N

If yes, state the level of glycosylated haemoglobin.

SECTION 6: Assessment

1. Do you consider there are any areas of concern in the applicant's assessment which require specialist referral or counselling? Y N

2. Do you have any doubts that the applicant is fit to exercise the privileges of his/her licence? Y N

3. Has the validity period of the medical certificate been extended in accordance with CASR 57.220 or has a new certificate been issued in accordance with CASR 57.225? Y N

4. Are you the applicant's General Practitioner? Y N

Examiner's Comments on Applicant's Health Questionnaire and Examination

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

CONFIDENTIAL
DECLARATION AND SIGNATORIES
CASA is collecting the information on this form for the purpose of assessing an application by you for a medical certificate. This is required by Part 67 of the Civil Aviation Safety Regulations 1998. The form and any associated medical reports or documents are provided to CASA by designated aviation medical examiners. The form will be stored by CASA in medical files for each ARN holder who applies for or seeks renewal of medical certificate in a Medical Records System (MRS). The form and associated documents are accessible by officers of CASA, such as the Legal Services Group. CASA will provide the forms and associated documents to medical specialists where a review of the medical issues raised in the report is necessary.

Before sending this report to Aviation Medicine, please check for inclusion of:
1. Applicant's signature 2. DAME'S number, stamp and signature 3. ECG, audiogram, ophthalmological report and serum lipids, if required (note: ECG trace should be mounted on the reverse side of this page) 4. Other reports, if required (please specify).

NOTE: It is an offence under the Civil Aviation Act to withhold any relevant information or to make any false or misleading statement for the purpose of obtaining a medical certificate.

DECLARATION BY APPLICANT: I hereby declare that I have carefully considered the statements made in this Medical Questionnaire and that to the best of my knowledge they are complete and correct. I acknowledge that medical reports required by CASA for certification may be provided to medical practitioners or specialists external to CASA and/or within CASA for their comment and review. I acknowledge that a fee applies to the processing and consideration of an application for a medical certificate and that CASA cannot issue the application or issue a medical certificate until the fee has been paid.

IDENTIFICATION: I, the designated aviation medical examiner, declare that I have sighted an identifying document with photograph or can personally identify the applicant.

Applicant's signature

Examining's signature

/ /20

/ /20

DAME STAMP

ECG Details and consultant cardiologist's opinion
If ECG performed by DAME, enter DAME identifier

Dame identifier

ECG originating Doctor's surname

if not a DAME

ECG originating (dd/mm/yy)

Date of ECG

/ /20

For consultant cardiologist's use only

Is the ECG within normal limits?

Y N

Please comment only if the ECG is outside normal limits

Consultant Cardiologist's Surname

(If ECG assessed by cardiac specialist)

Consultant's signature

(/dd/mm/yy)

/ /20

CONFIDENTIAL
Medical Questionnaire and Examination Form for Revalidation of a Medical Certificate which is Current or has Lapsed for Less than Five Years

All items in section 1 and 2 must be typed. All other responses may be typed or written clearly in black pen. Please mark response boxes with an X within the confines of the box. Written comments should be confined to the Comments section on page 5.

Important Note: A fee applies for the processing and consideration of an application for a medical certificate. CASA cannot process your application or issue the certificate until the fee is paid.

SECTION 1: Designated Aviation Medical Examiner Information

Examiner's surname

DAME Identifier

Date of examination (dd/mm/yy)

SECTION 2: Applicant's Personal Information

Title: Mr Mrs Ms Other

Family name

Given names

Initials

Former name

Residential address (Mandatory requirement)

Date of birth (dd/mm/yy)

Age

Sex M F

Contact phone numbers

STD After hours

STD Working hours

Suburb or town

State/Country

Postcode or overseas code

Postal address (leave blank unless different from residential)

Total flying hours (to nearest hour)

Suburb or town

State/Country

Postcode or overseas code

Employer (professional aircrew only)

Hours flown in the last six months

Date of the last Australian Civil Aviation Medical Examination (dd/mm/yy)

1/20

Applicants usual Medical Practitioner and Dentist

Practitioner: Name Town State Phone No.

Dentist: Name Town State Phone No.

CONFIDENTIAL
SECTION 3: Aviation Information

Mark as required. This examination is for:

Standard 1
Airline Transport Pilot
Commercial Pilot
Flight Engineer/Navigator

Standard 2
Private Pilot
*Student Pilot

Standard 3
Air Traffic Control Officer
Flight Service Officer

**Other (see below)

*Which flying training organisation will be conducting the student's training?
and, at which air field?

Category of aircraft the applicant intends to operate:

Powered
Fixed-Wing
<5700Kg MTOW
5700Kg - 15,000Kg MTOW

>15,000Kg MTOW

Rotary-Wing
<2300Kg
2300Kg or >

Other (incl. gyrocopters)

Special**
Balloons
Gilders
Ultra-light and other

Aerobatics

Will the pilot be engaging in:
Agricultural flying
Mustering

The pilot's intended operations are:
Single-pilot
Multi-crew
Command instrument rating

SECTION 4: Health Questionnaire (please use black pen)

Since the last aviation medical examination, or in the last two years, has the applicant:

1. been admitted to a hospital or suffered from any medical condition which may affect his/her ability to exercise the privileges of his/her licence? Y N
2. suffered any chest or abdominal pain? Y N
3. suffered any pain severe enough to be disabling? Y N
4. coughed or vomited blood? Y N
5. passed blood with urine or faeces? Y N
6. taken any medically prescribed drugs for longer than two consecutive weeks? Y N
7. had any traffic or criminal convictions relating to drugs or alcohol? Y N
7A. EVER, or is he/she NOW using any of the following substances: opiates, cannabinoids, sedatives and hypnotics, cocaine, other psychostimulants, hallucinogens or volatile solvents? Y N
8. had a laboratory test for HIV infection? Y N

If yes, what was the result? +ve -ve

9. smoked tobacco in any form? Y N

if cigarettes, state number per day. <10 10-25 >25

10. undertaken exercise for at least 3 times per week for 20 minutes or more? Y N

11. is there any significant family cardiac history? Y N

CONFIDENTIAL
**SECTION 5A: Medical Examination**

1. Height (to nearest centimetre) cm  
  Weight (to nearest kilogram) Kg  
  In all cases state the Body Mass Index.  
  \[\text{BMI} = \frac{\text{weight (kg)}}{\text{height}^2 \text{ (m}^2\text{)}}\]  
  Is the Body Mass Index outside the range 17.0 - 35.0? Y N  

2. In all cases, state the pulse rate  
  Pulse rate: mark appropriate range box  
  - <45  
  - 45 - 120  
  - >120  
  Is there any abnormality in the pulse rhythm? Y N  

3. Blood pressure:  
  Is the blood pressure outside of acceptable limits (150/90)? Y N  
  State the blood pressure  

4. Is there any abnormality in the cardiovascular system including heart sounds, peripheral vasculature and perfusion? Y N  

5. Is anti-hypertensive therapy being used? Y N  
  If yes, state medication and dose.  

**Please note, an ECG/Stress ECG is required at specific intervals for all class 1 & 3 applicants.**  

6. If an ECG has been performed, is it abnormal? (leave blank if no ECG performed) Y N  

7. Serum lipids required for all Class 1 & 3 at ages 25 and 5 yearly intervals thereafter.  
   State the readings.  
   - Total Chol.  
   - HDL Chol.  
   - LDL Chol.  

8. Is the peak flow rate of FEV₁ abnormal? (range is within 30% of the predicted value for height, sex and age) Y N  

9. Is there any abnormality of the respiratory system, including dyspnoea, wheezing, cyanosis, decreased respiratory movements, etc.? Y N  

10. In the abdomen, Is there any tenderness, palpable mass or hernia? Y N  

11. Is there any abnormality of the gastro-intestinal system? Y N  

12. Is there any abnormality of the nervous system, including cranial nerves, muscle tone, power, sensory perception and reflexes? Y N  

13. Is there any significant abnormality or limitation of movement in the musculo-skeletal system? Y N  

14. Is there anything in the applicant's personality or appearance which causes concern? Y N  

15. Is there any evidence of drug or alcohol abuse? Y N  

**CONFIDENTIAL**
SECTION 5B: Vision

<table>
<thead>
<tr>
<th>Distance Vision Standard</th>
<th>Class 1 &amp; 3 R6/9</th>
<th>Class 2 R6/12</th>
<th>L6/9</th>
<th>B6/6</th>
</tr>
</thead>
</table>

16. Does the applicant require visual correction for distant vision? 
   If yes, type of correction used: 
   - spectacles 
   - soft contact lenses 
   - hard or gas permeable contact lenses

17. Distance visual acuity using a standard Snellen chart at 6 metres:

   **Without correction:**
   - Right eye 8/5
   - Left eye 8/5
   - Binocular 8/5
   State visual acuity if worse than 6/12
   - Right eye
   - Left eye
   - Binocular

   **With correction:**
   - Right eye 8/5
   - Left eye 8/5
   - Binocular 8/5
   State visual acuity if worse than 6/12
   - Right eye
   - Left eye
   - Binocular

Near Vision Standard all Classes N14 at 1 metre and N5 at 30-50cms binoecularly

18. Does the applicant require visual correction for near vision? 
19. Does the applicant fail to meet the near vision standard? 
   (If yes, elaborate in the "Examiners Comments" and refer for further vision assessment.)
20. Is there any abnormality of the optic fundus? 
21. Is there any abnormality of the visual fields? 
22. Is there any abnormality of the pupillary reaction to light and accommodation? 
23. Is there any abnormality of the eyes and their adnexae? 
24. Has ophthalmological assessment been arranged?

CONFIDENTIAL
SECTION 5C: Hearing

25. Is there any abnormality of the auditory canals and ear drums? Y  N
26. Does the applicant fail to hear a conversational voice at 2 metres? Y  N

An audiogram must be sent for Class 1 and Class 3 medical certificates at initial issue.

27. Does the applicant exceed 35db loss in either ear at 0.5, 1.0 or 2.0 KHz, or 50db loss at 3.0 KHz? Y  N

SECTION 5D: Urine

28. Does the urine test positive for protein, glucose or blood? Y  N
29. Is the applicant diabetic? Y  N

If yes, state the level of glycosylated haemoglobin.

SECTION 6: Assessment

1. Do you consider there are any areas of concern in the applicant's assessment which require specialist referral or counselling? Y  N
2. Do you have any doubts that the applicant is fit to exercise the privileges of his/her licence? Y  N
3. Has the validity period of the medical certificate been extended in accordance with CASR 87.220 or has a new certificate been issued in accordance with CASR 87.225? Y  N

4. Are you the applicant's General Practitioner? Y  N

Examiner's Comments on Applicant's Health Questionnaire and Examination
DECLARATION AND SIGNATORIES

CASA is collecting the information on this form for the purpose of assessing an application by you for a medical certificate. This is required by Part 67 of the Civil Aviation Safety Regulations 1998. The form and any associated medical reports or documents are provided to CASA by designated aviation medical examiners. The form will be stored by CASA in medical files for each APN holder who applies for or seeks renewal of medical certificate in a Medical Records System (MRS). The form and associated documents are accessible by officers CASA's Office of Aviation Medicine. The documents may be provided, when required, to other officers of CASA, such as the Legal Services Group. CASA will provide the forms and associated documents to medical specialists where a review of medical issues raised in the report is necessary.

Before sending this report to Aviation Medicine, please check for inclusion of:
1. Applicant's signature  2. DAME'S number, stamp and signature  3. ECG, audiogram, ophthalmological report and serum lipids, if required (note: ECG trace should be mounted on the reverse side of this page)  4. Other reports, if required (please specify).

NOTE: It is an offence under the Civil Aviation Act to withhold any relevant information or to make any false or misleading statement for the purpose of obtaining a medical certificate.

DECLARATION BY APPLICANT: I hereby declare that I have carefully considered the statements made in this Medical Questionnaire and that to the best of my knowledge they are complete and correct. I acknowledge that medical reports required by CASA for certification may be passed to medical practitioners or specialists external to CASA and/or within CASA for their comment and review. I acknowledge that a fee applies to the processing and consideration of an application for a medical certificate and CASA cannot process my application or issue a medical certificate until a fee has been paid.

IDENTIFICATION: I, the designated aviation medical examiner, declare that I have sighted an identifying document with photograph or can personally identify the applicant.

Applicant's signature:

/ /20

Example's signature:

/ /20

ECG Details and consultant cardiologist's opinion

If ECG performed by DAME, enter DAME identifier

Dame Identifier:

ECG originating Doctor's surname:

Date of ECG (dd/mm/yy):

If not a DAME

For consultant cardiologist's use only

Is the ECG within normal limits? Y N

Please comment only if the ECG is outside normal limits

Consultant Cardiologist's Surname:

If ECG assessed by cardiac specialist

Consultant's signature:

(dd/mm/yy):

/ /20

CONFIDENTIAL
Medical Questionnaire and Examination

A fee applies for the processing and consideration of an application for a medical certificate. CASA cannot process your application or issue the certificate until the fee is paid.

If the applicant does not have an ARN, they must complete Form 1162 Aviation Reference Number (ARN) Application. Form 1162 can be found at http://casa.gov.au/manuals/legislation/af/1162.pdf

Part A — Designated Aviation Medical Examiner (DAME) details

- DAME's surname
- Given name
- Phone
- Business hrs
- Fax
- Email address

Part B — Application details

<table>
<thead>
<tr>
<th>Certificates applied for</th>
<th>Class 1</th>
<th>Class 2</th>
<th>Class 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations performed or intended</td>
<td>Airline Transport Pilot</td>
<td>Private Pilot</td>
<td>Air Traffic Control Officer</td>
</tr>
<tr>
<td></td>
<td>Commercial Pilot</td>
<td>Student Pilot</td>
<td>Flight Service Officer</td>
</tr>
<tr>
<td></td>
<td>Flight Engineer/Navigator</td>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

Part C — Applicant details

<table>
<thead>
<tr>
<th>Title</th>
<th>Mr</th>
<th>Mrs</th>
<th>Ms</th>
<th>Other</th>
<th>ARN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicant's surname</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Given name</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date of birth</td>
<td>Female</td>
<td>Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential address</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Suburb/Town</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postal address (if different to above)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suburb/Town</td>
<td>State</td>
<td>Postcode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phone</td>
<td>Business hrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>After hrs</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Mobile</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Email address</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the applicant have a regular general practitioner?</td>
<td>No</td>
<td>Yes</td>
<td>Name</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suburb</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the applicant have a regular dentist?</td>
<td>No</td>
<td>Yes</td>
<td>Name</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suburb</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total flying hours (to nearest hour)</td>
<td>Hours flown in the last 6 months (to nearest hour)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employer (if professional pilot)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

---

Medical In Confidence when completed

CASA 1162 06/09
Part D — Aviation

1. Do any of the following apply: Student Pilot  Balloon Pilot  IFR  Multicrew
   Observer  Musterling  Charter  Aerobatics
   Agricultural Flying  Single Pilot  Instructor  Formation Flying

2. What category or aircraft does the applicant intend to operate?
   Fixed-Wing <5,700 kg MTOW
   Fixed-Wing 5,700 kg – 15,000 kg
   Fixed-Wing >15,000 kg
   Rotary Wing

Part E — History

3. Has the applicant ever (original) or since the last medical (renewal) had any medical problems, treatment of any sort or any visits to a doctor or other health provider?
   No  Yes  ✔ Outline conditions, dates and treatment at Part I

4. Has the applicant ever sought medical advice or had any medical treatment for conditions other than routine checkups or minor illnesses?
   No  Yes  ✔ Outline conditions and treatment at Part I

5. Has the applicant undergone any medical or surgical procedures including minor procedures?
   No  Yes  ✔ List procedures and dates at Part I

6. Has the applicant taken any prescribed or over the counter medications for greater than 2 consecutive weeks (include herbal or alternative therapies)?
   Drug name (Generic)  Drug name (Other)  Dose  Frequency  Start date  End date  Duration
   No  Yes  ✔ Give details below and provide comments at Part I if relevant

7. Have these medications changed or has the applicant taken any other medications for more than 2 consecutive weeks?
   No  Yes  ✔ Give details at Part I

8. Has the applicant ever been:
   • refused an aviation medical or had such an assessment previously revoked or suspended?
     No  Yes  ✔ Give the reason for such refusal, revocation or suspension at Part I
   • rejected from employment for medical reasons?
     No  Yes  ✔ Give details at Part I
   • medically rejected or discharged from armed services?
     No  Yes
   • refused life insurance for a medical reason?
     No  Yes

9. Is the applicant applying for a Class 2 medical?
   No  Yes  ✔ If the answer to these three questions is "Yes", go straight to Question 17 on page E5 (do not complete questions 10 – 16)
   Is the applicant less than 40 years of age?
   No  Yes  ✔ If you answered "No" to any of these three questions, continue to Question 10 on the next page
   Did you answer 'No' to questions 3 – 8 above?
   No  Yes
10. Has the applicant received compensation for any medical condition, including from the Department of Veterans' Affairs or Department of Defence?  
   No Yes ▶ List procedures and dates at Part I

11. In the last 6 months, has the applicant smoked tobacco in any form?  
   No Yes ▶
   Type
   Amount

12. Does the applicant undertake exercise 3 times per week for 20 minutes or more?  
   No Yes

13. Is the applicant pregnant?  
   N/A No Yes ▶ Give details of gestation at Part I

14. Has the applicant sustained any major injury to bone, tendon, ligament or muscle?  
   No Yes ▶ Give details of ongoing symptoms at Part I

15. Has the applicant experienced any eye conditions or disturbance in vision?  
   No Yes ▶ Give details at Part I

16. **ORIGINAL issue** — Has the applicant ever had any of the following symptoms or diagnoses?  
**RENEWAL** — Since the applicant’s last aviation medical exam, has the applicant had any of the following?

<table>
<thead>
<tr>
<th>Symptom Description</th>
<th>CVS</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart attack</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Ischaemic Heart disease</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Coronary Artery Disease</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Tendonitis</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Arthritis</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Rheumatoid Arthritis</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Family history (parents/siblings) of heart disease under 60</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symptom Description</th>
<th>Respiratory and ENT</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistent cough</td>
<td>No Yes</td>
<td>Lung cancer No Yes</td>
</tr>
<tr>
<td>Chronc cough</td>
<td>No Yes</td>
<td>Asthma No Yes</td>
</tr>
<tr>
<td>Wheeze</td>
<td>No Yes</td>
<td>Exercise induced asthma No Yes</td>
</tr>
<tr>
<td>Shortness of breath</td>
<td>No Yes</td>
<td>Tuberculosis No Yes</td>
</tr>
<tr>
<td>Coughing up blood</td>
<td>No Yes</td>
<td>Emphysema No Yes</td>
</tr>
<tr>
<td>Balancing trouble</td>
<td>No Yes</td>
<td>Chronic bronchitis No Yes</td>
</tr>
<tr>
<td>Hearing problems</td>
<td>No Yes</td>
<td>Lung collapse No Yes</td>
</tr>
<tr>
<td>Ear problems</td>
<td>No Yes</td>
<td>Pneumothorax No Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symptom Description</th>
<th>Gastro/Endocrine</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vomiting</td>
<td>No Yes</td>
<td>Bowel cancer No Yes</td>
</tr>
<tr>
<td>Blood in vomit</td>
<td>No Yes</td>
<td>Diabetes No Yes</td>
</tr>
<tr>
<td>Blood in stool</td>
<td>No Yes</td>
<td>Impaired glucose tolerance No Yes</td>
</tr>
<tr>
<td>High blood sugar</td>
<td>No Yes</td>
<td>Thyroid deficiency or hyperthyroidism No Yes</td>
</tr>
<tr>
<td>Sugar in urine</td>
<td>No Yes</td>
<td>Crohn's disease No Yes</td>
</tr>
<tr>
<td>Any other problems with bowels, stomach, liver</td>
<td>No Yes</td>
<td>Ulcerative colitis No Yes</td>
</tr>
</tbody>
</table>
### d. Genitourinary

**Give details at Part I**

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kidney trouble</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Bladder trouble</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Difficulty with passing urine</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Blood in urine</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Stones in urine</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>MALE only</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prostate trouble</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>FEMALE only</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Menstrual or gynaecological problems</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Diagnosis**

- Prostate cancer: No, Yes
- Dysmenorrhoea: No, Yes
- Uterine fibroids: No, Yes

### e. Neurology

**Give details of symptoms, severity and frequency at Part I**

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequent severe headaches</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Head injury</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Unconsciousness</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Fits</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Faints</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Blackouts</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Funny turns</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Dizziness</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Tremors</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Weakness of the limbs</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Paralysis</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Diagnosis**

- Stroke: No, Yes
- Cerebro vascular accident: No, Yes
- Transient ischaemic attack: No, Yes
- Traumatic brain injury: No, Yes

### f. Miscellaneous

**Give details of diagnosis and treatment at Part I**

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth or tumour</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Disabling spine, back or neck trouble</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Bleeding or clotting disorder</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Diagnosis**

- Skin cancer: No, Yes
- Melanoma: No, Yes
- Cancer: No, Yes
- Anaemia: No, Yes
- Deep vein thrombosis: No, Yes
- Pulmonary embolus: No, Yes
- HIV positive diagnosis: No, Yes
- Obstructive Sleep Apnoea (OSA): No, Yes
17. Has the applicant received treatment or been diagnosed with depression or any other psychiatric illness? No Yes ▷ Give details of symptoms and treatment at Part I

18. During the last month has the applicant been feeling down, depressed or hopeless? No ▷ Go to Question 20 Yes


20. During the last month has the applicant often been bothered by having little interest or pleasure in doing things? No Yes ▷ Give details at Part I

21. With respect to drugs or alcohol, has the applicant experienced:
   - any traffic or criminal convictions
   - any accidents or incidents, or
   - undergone treatment or counselling? No Yes ▷ Give details at Part I

22. FAST test
   Never = 0  ▪ Less than monthly = 1 ▪ Monthly = 2  ▪ Weekly = 3  ▪ Daily or almost daily = 4
   a. How often does the applicant have 8 or more drinks on one occasion? ▶
   b. How often during the last year has the applicant been unable to remember what happened the night before because they had been drinking? ▶
   c. How often during the last year has the applicant failed to do what was normally expected of them because of their drinking? ▶
   d. Has a relative or friend, a doctor or other health worker been concerned about the applicant's drinking or suggested they cut down? No = 0 ▪ Yes, but not in the last year = 2 ▪ Yes in the last year = 4
   
   FAST test result


24. Has the applicant ever used or is the applicant now using any of the following substances: cocaine, morphine, pethidine, opium, marijuana, amphetamines, LSD, ecstasy (or other designer drugs), volatile solvents (e.g. petrol or glue sniffing) or other psycho-active substances? No Yes ▷ Give details of type, frequency of use and when last used at Part I
25. Does the applicant ever find themselves dropping off to sleep, take naps, or feel sleepy during the day?
   Yes  
   No   
   Have you calculated an EPWORTH score?
   No  
   Yes  
   EPWORTH score  
   Go to Question 26

   How likely is the applicant to doze off or fall asleep (in contrast to just feeling tired) in the following situations?

   Use the following scale to rate the applicant's chance of dozing in the following situations:
   Would never doze = 0  •  Slight chance of dozing = 1  •  Moderate chance of dozing = 2  •  High chance of dozing = 3

   Sitting and reading
   Watching TV
   Sitting, inactive, in a public place
   As a passenger in a car for an hour
   Lying down in the afternoon
   Sitting and talking to someone
   Sitting quietly after a lunch without alcohol
   In a car, while stopped for a few minutes in traffic

   **EPWORTH sleepiness score**

<table>
<thead>
<tr>
<th>Score analysis</th>
<th>1 – 6: Applicant is getting enough sleep</th>
<th>9 – 15: Applicant is very sleepy and should seek medical advice</th>
<th>16 or greater: Applicant is dangerously sleepy and should seek medical advice</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 – 8: Applicant tends to be sleepy during the day; this is the average score</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Part F — Clinical measurement**

26. Examination

   State the applicant's height (to nearest cm)
   State the applicant's weight (to nearest kg)

   Body Mass Index (BMI)
   \[ BMI = \frac{weight \text{ (kg)}}{height^2 \text{ (m^2)}} \]
   If above 37, BSL should be assessed as clinically indicated and CASA may require a functional cockpit check

   Pulse rate (BPM)
   If above 100 or below 40, give comments at Part I

   Blood pressure (in mmHg)
   Systolic
   Diastolic
   If outside acceptable limit of 150/90, give comments at Part I

27. If examination requires Serum Lipids specialist report:

   Fasting serum lipid levels
   (in mmol/L)
   Total cholesterol
   HDL cholesterol
   Fasting blood glucose level (FBS)

   State the measured level of Glycosylated Haemoglobin
   (Note: ONLY required for diabetics)

28. Does the urine test positive for other than trace of blood, glucose or protein?
   No  
   Yes  
   Blood  
   Protein  
   Urine

---

- Medical in Confidence when completed -
Vision

29. What is the uncorrected distance visual acuity using a standard Snellen chart at 6 metres?
   - Right eye uncorrected: 6/6 6/6 6/6 6/12 Worse than 6/12
   - Left eye uncorrected: 6/6 6/6 6/6 6/12 Worse than 6/12
   - Binocular uncorrected: 6/6 6/6 6/6 6/12 Worse than 6/12

30. Does the applicant use visual correction for distance vision?
   - No
   - Yes
   - Type of correction: Spectacles, Hard contact lenses, Soft contact lenses
   - Remind pilot to carry spare visual correction when flying

31. What is the corrected distance visual acuity using a standard Snellen chart at 6 metres (if applicable)?
   - Right eye with correction: 6/6 6/6 6/6 6/12 Worse than 6/12
   - Left eye with correction: 6/6 6/6 6/6 6/12 Worse than 6/12
   - Binocular with correction: 6/6 6/6 6/6 6/12 Worse than 6/12

32. Does the applicant fail to meet the near vision standard (N5 at 30cm)?
   - No
   - Yes

33. Does the applicant require visual correction for near vision (N5 at 30cm)?
   - No
   - Yes

34. Does the applicant fail to meet the intermediate vision standard (N14 at 1m)?
   - No
   - Yes

35. Does the applicant require distance correction to meet the Intermediate vision standard (N14 at 1m)?
   - No
   - Yes

36. Is there any abnormality of the:
   - pupillary reaction to light and accommodation?
   - eyes and their adnexae?
   - optic fundi?
   - visual fields?
   - No
   - Yes

37. **ORIGINAL Issue only**
    - Does the applicant make 3 or more errors on the 24 plate Ishihara test?
    - No
    - Yes

---

*Medical in Confidence when completed*
Part G — Physical examination

38. Is there any irregularity in the character of the pulse?
   No

39. Is there any abnormality in the cardiovascular system including heart sounds, peripheral perfusion and vasculature?
   No

40. Was an ECG required for this examination?
   No
   Yes  How has the ECG been read?
   Electronic
   Is there any significant abnormality of the ECG?
   No
   How has the ECG trace been forwarded to CASA?
   Posted

41. Is there any abnormality of the respiratory system (including dyspnoea, wheezing, cyanosis, decreased respiratory movements, or history of asthma)?
   No

42. Is there any abnormality of the gastro-intestinal system?
   No

43. Is there any tenderness, palpable mass or hernia in the abdomen?
   No

44. Is there any significant abnormality or limitation of movement in the musculo-skeletal system?
   No

45. Is there any clinical evidence of alcohol, drug or other substance abuse?
   No

46. Are there any overt signs of neurological disease?
   No

47. Is there anything in the applicant's personality or appearance that causes concern?
   No

48. GFR score

Hearing

49. Is there any abnormality of the auditory canals and ear drums?
   No

50. Does the applicant fail to hear a conversational voice at 2 metres?
   No

Note: An Audiogram is required for original applications for classes 1 and 3 AND at the ages 25 and 5 yearly intervals thereafter.
   If an Audiogram is performed Complete Questions 51 – 54
   Otherwise Go straight to Question 55 on the next page

51. Has the applicant had any ear trouble since the last hearing test?
   No

52. Does the applicant use a hearing aid?
   No

53. Has the applicant been exposed to loud noise in the last week?
   No

54. State the applicant's hearing threshold levels in dbHL
   Do not include units

<table>
<thead>
<tr>
<th>Left ear (dbHL)</th>
<th>Right ear (dbHL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold levels at 0.5 kHz</td>
<td></td>
</tr>
<tr>
<td>Threshold levels at 1.0 kHz</td>
<td></td>
</tr>
<tr>
<td>Threshold levels at 2.0 kHz</td>
<td></td>
</tr>
<tr>
<td>Threshold levels at 3.0 kHz</td>
<td></td>
</tr>
</tbody>
</table>

--- Medical in Confidence when completed ---
Part H – Assessment

55. Do you have any doubt that the applicant is fit to exercise the privileges of the licence held sought? 
   No | Yes  
   | Yes ▶ Elaborate your concerns and provide any general comments at Part 1

56. Is there any issue in the applicant’s assessment which requires specialist referral or review by CASA? 
   No | Yes  
   | Yes ▶ Please detail any specialist referrals you have arranged, e.g. ECG, Ophth, Audio at Part 1

57. Has the medical certificate been revalidated? 
   No | Yes  
   | Yes ▶ Date certificate revalidated to

Part I – Additional information

58. Use this space to provide details as per instructions throughout the form, or for any information you think may be relevant to the medical examination. Please also provide the question number that the information relates to and print clearly.

   Q No. | Details and Information
Part J – Application for Aviation Medical Certificate Declaration

Applicant to complete

1. (name of applicant) Date of examination

• am applying for an Aviation Medical Certificate in accordance with CASR Part 67; and
• have carefully considered every question the examiner has asked me in relation to the medical certificate I am applying for and I have reviewed the answers in the Medical Questionnaire and Examination form. I have answered every question correctly and completely (see Note 1 below); and
• except as provided in CASR 67.180(5) (see Note 2 below), authorise the disclosure to CASA and the examiner of any information about me that may help CASA to decide whether I meet the relevant medical standard, being information that is held by a person, organisation, body or authority referred to in CASR 67.180(6) (see Note 3 below); and
• understand that CASA will use relevant medical information for internal audit or research (results will be de-identified), and disclose relevant medical information to another ICAO State's civil aviation regulator if I hold, or apply for, medical certification in that State; and
• acknowledge that a fee applies to the processing and consideration of a medical certificate application and CASA may not process my application until the appropriate fee has been paid.

Applicant’s signature

DAME to complete

1. (name of DAME) ARN

• am satisfied that the person who I have examined for a medical certificate is the applicant whose signature appears above; and
• for the purposes of CASR 67.170 (Evidence of Identity) (cross one only)
  - I have sighted current photographic identification of the applicant.
  OR

I know or have reason to believe that the applicant is who the applicant claims to be.

DAME’s signature

Note 1
A false statement in relation to the issue of a certificate is an offence punishable by imprisonment for 12 months (see the Criminal Code section 137.1).

Note 2
The authorisation in paragraph 3 above does not require a person, organisation, body or authority to disclose information:
• that was collected for use as evidence in a legal proceeding, and has not been tendered or admitted as evidence in a court; or
• information that could not, because of Part 3.10 of the Evidence Act 1995, be given in evidence in any proceeding to which that Part applies. (Part 3.10 of the Evidence Act 1995 is about client legal privilege, religious confessions, self-incrimination in other proceedings, and evidence excluded in the public interest – for details, see that Act.)

Note 3: CASA 67.180(6)
• A medical practitioner.
• Any other person or organisation (including a hospital) that has made a physical, psychological or psychiatric examination of the applicant.
• Any other person or organisation (including a hospital) that has treated the applicant for a medically significant condition.
• An employer (including a former employer) of the applicant.
• Any other person, organisation, body of authority (including a police force or police service and, subject to Part VII of the Crimes Act 1914, a court) that holds information of the kind referred to in paragraph 3 above.

Privacy – CASA is collecting the information on this form for the purpose of assessing an application by you for a medical certificate. This is required by Part 67 of the Civil Aviation Safety Regulations 1998. The form and any associated medical reports or documents are provided to CASA by a designated aviation medical examiner. The form will be stored by CASA in medical files for each ARN holder who applies for or seeks renewal of a medical certificate in a Medical Records System (MRS). The form and associated documents are accessible by officers of CASA’s Office of Aviation Medicine. The documents may be provided, when required, to other officers of CASA, such as the Legal Services Group. CASA will provide the forms and associated documents to medical specialists where a review of medical issues raised in the report is necessary.
Part K – ECG details and consultant cardiologist’s opinion

Date of ECG

If ECG was performed by the DAME, enter the DAME stamp number
ECG originating Doctor’s surname
(If not a DAME)

For consultant cardiologist’s use only
Is the ECG within normal limits?
   No  ✗ Give details
   Yes

Consulting cardiologist’s surname
(If ECG assessed by cardiac specialist)

Consultant’s signature  

Date

– Medical in Confidence when completed –